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UTAH FLORA: POLYGONACEAE

Stanley L. Welsh[1]

Abstract.— The genera and species of Polygonaceae in Utah are revised. Descriptions and keys to taxa are included, along with habitat, elevation, and distributional data. Taxonomic problems are outlined and discussed. Described as new is *Eriogonum brevicaule* Nutt. var. *promiscuum* Welsh. New nomenclatural combinations include *Eriogonum batemanii* Jones var. *eremicum* (Reveal) Welsh and var. *ostlundii* (Jones) Welsh; *E. brevicaule* Nutt. var. *desertorum* (Maguire) Welsh, var. *ephedroides* (Reveal) Welsh, var. *loganum* (A. Nels.) Welsh, var. *nanum* (Reveal) Welsh, and var. *viridulum* (Reveal) Welsh; *E. corymbosum* Benth var. *cronquistii* (Reveal) Welsh, var. *humivagans* (Reveal) Welsh, var. *smithii* (Reveal) Welsh; *E. lonchophyllum* T. & G. var. *saurinum* (Reveal) Welsh; *E. nummulare* Jones var. *ammophilum* (Reveal) Welsh; *E. racemosum* Nutt. var. *coccineum* (J. T. Howell) Welsh and var. *zionis* (J. T. Howell) Welsh; *E. spathulatum* Gray var. *natum* (Reveal) Welsh.

The members of the Polygonaceae, especially those in the genera *Eriogonum*, *Polygonum*, and *Rumex*, have consistently been regarded as taxonomically difficult. Flowers are greatly reduced and often similar from taxon to taxon. They have been used to supplement vegetative characters as diagnostic tools. Often, vegetative features are inconstant, and their use has led to frustration in attempts to identify or classify members of this family.

Certainly the most difficult genus is *Eriogonum*, which consists of both annuals and perennials. The annuals are rather well marked, even though distinguished by minute, but mainly consistent, diagnostic features. The perennials pose problems due, in part at least, to hybridization and the tendency of hybrid derivatives to adapt to specialized environments, often limited by edaphic characteristics. Populations on given substrates are often relatively uniform, but they blend at the edges into the parental types. Some of the segregates are sufficiently distinct and geographically correlated as to warrant taxonomic recognition, but others are not. There is a general lack of consistent diagnostic features. Use of single criteria, such as stem pubescence, branching of the inflorescence, or flower color, leads to arbitrarily defined assemblages of specimens that often do not constitute taxa. Apparently similar morphological groupings can be derived quite independently.

Not all groups of perennials suffer from the same problems or to the same extent. *Eriogonum alatum* stands quite apart from other species. The group of species centering around *E. umbellatum*, which has flowers long-attenuated basally, are distinctive. Soil specialists in the pulvinate-caespitose, mound-forming series are remarkably discrete. Major problems occur in the group of acaulescent perennials and shrubs.

Thus, attempts at presentation of a taxonomy that is equivalent to other families is difficult, if not impossible. The taxonomy

[1]Life Science Museum and Department of Range Science, Brigham Young University, Provo, Utah 84602

must, however, reflect the reality of the naturally occuring poppulations. The attempt presented herein depicts a reticulum of interrelated taxa, connected by series of intermediates. Traditional taxonomy is based, largely, on a concept of lineality, where taxa give rise to others through accumulated genetic modifiers. The system of nomenclature is likewise lineal, with names ordered to imply descent in only one direction, i.e., from the next higher category. Taxonomy within the woody and related perennial species of *Eriogonum* does not fit tradition, but is hardly unique. Similar situations occur in such families as the Chenopodiaceae (*Atriplex*) and Cactaceae (*Opuntia*).

Problems are discussed specifically in the taxa within which they occur.

Polygonum consists of several groups of species, some of which have been regarded at generic rank. The groups are rather easily defined, and the species within each group are obviously related. The most difficult taxonomic problems lie within the *aviculare* section, where taxonomic criteria are not strongly correlated. Introduced Old World species complicate the picture, since only portions of the total variation of the species are represented, and application of names might be tentative.

Rumex consists of both indigenous and introduced taxa. Nature of the inner perianth segments, the valves, has been relied on for diagnostic features. A grainlike tuberosity forms on one or more of the segments in some taxa, or is lacking altogether. The character is not always reliable. However, the taxa are, for the most part, distinctive. Evidence of intermediacy revolves around those plants similar to *R. crispus*, *R. patentia*, and *R. obtusifolius*. The similar *R. occidentalis* is not always readily separable from phases of that group.

Economic importance of the Polygonaceae in Utah is both positive (rhubarb) and negative (black bindweed, knotweed, and dock). The members are of considerable ecological importance, however. Many taxa occupy distinctive habitats, sometimes as the principal component of the vegetation. Others are pioneer species, capable of occupying a large number of habitats. Two species are grown routinely as ornamentals, *Polygonum aubertii*, a twining vine, and *P. cuspidatum*, a large shrublike, herbaceous perennial. Some of the eriogonums are beautiful and show potential for use as ornamentals. Others should be investigated for reclamation potential. Possible use in rehabilitation is suggested by their occupation of harsh substrates such as those associated with coal-bearing strata. Cultural criteria require investigation. *Rumex crispus* is lauded by herbalists as a curative.

The family is large by Utah standards, with 87 species and 27 varieties, or a total of 114 taxa in 6 genera. The largest genus is *Eriogonum*, with 55 species and 26 varieties, or a total of 81 taxa. This study is based on examination of 3480 specimens, with 551 (15.8%) of them collected by me.

POLYGONACEAE

Annual or perennial herbs, subshrubs, shrubs, or twining vines; leaves simple, alternate, opposite, or whorled; stipules forming a sheath (ocrea) or absent; flowers perfect or polygamo-dioecious, regular; perianth 2- to 6-parted or -cleft; stamens 2–9; styles 2 or 3; ovary superior, 1-loculed, 1-ovuled; fruit an achene.

1. Sheathing stipules lacking; flowers subtended by a campanulate, obconic, or cylindric involucre, or by a folded, 2-toothed bract 2
— Sheathing stipules present; flowers not subtended by an involucre or with a folded, 2-toothed bract 5

2(1). Flowers solitary, subtended by a single, folded, 2-toothed bract, this accrescent and prominently veined in fruit; plants slender, broad-leaved annuals, known from Washington County ..... *Pterostegia*
— Flowers solitary (in *Chorizanthe*) or several, arising from a campanulate, obconic, or cylindric involucre; plants various, but not as above 3

3(2). Involucres with lobes or teeth not spiny; bracts unarmed; plants annual, perennial, or shrubby ..... *Eriogonum*
— Involucres and bracts armed with spines; plants annual 4

4(3). Involucres with 2 or more flowers, the lobes tipped with straight spines or bristles; main bracts of inflorescence connate-perfoliate, disklike ..... *Oxytheca*
— Involucres usually with one flower, the lobes tipped with hooked or straight spines; bracts not both perfoliate and disklike ..... *Chorizanthe*

5(1). Leaves all basal, the blades reniform; sepals 4; styles 2; plants of high elevations ..... *Oxyria*
— Leaves cauline or basal, but, if basal, the blades not reniform and plants not or seldom of high elevations; sepals 5 or 6; styles 2 or 3; plants variously distributed 6

6(5). Sepals 5 (rarely 4), all similar and erect in fruit ..... *Polygonum*
— Sepals 6, in 2 sets, the inner ones erect and winged in fruit, or the wings from the achenes, the outer sepals reflexed and often smaller 7

7(6). Stipular sheathes large and prominent; stamens 8–10; leaf blades ovate to orbicular; plants cultivated and persisting ..... *Rheum*
— Stipular sheaths not prominent, evanescent; stamens 6; leaf blades narrower; plants indigenous or adventive, not cultivated ..... *Rumex*

CHORIZANTHE R. Br. ex Benth.

Annual herbs; stems more or less dichotomously branched or simple; leaves basal or cauline and alternate, entire, the upper ones often reduced to opposite or whorled bracts; inflorescence cymose or capitate; involucres sessile, cylindric to urn shaped or funnelform, mostly 1-flowered, 3- to 6-angled or -ribbed and 3- to 6-toothed or -cleft, the teeth spreading, armed with straight or recurved awns; flowers pedicellate or subsessile; bractlets lacking; perianth 6-parted or -cleft; stamens 3–9; styles 3; achenes glabrous, 3-angled.

1. Foliar bracts 3-lobed; involucres with 3, broad, horizontally spreading, saccate horns at the base ..... *C. thurberi*
— Foliar bracts entire; involucres not horned at the base 2

2(1). Involucres 6-ribbed, the 6 teeth sparingly recurved apically, less than 2 mm long; stems very brittle and soon falling apart; foliage leaves all basal; stem leaves reduced to subulate bracts ..... *C. brevicornu*
— Involucres 3-angled, the 3 teeth straight, more than 5 mm long; stems not brittle (the plants persisting and burlike); stems with some foliar leaves like the basal ones ..... *C. rigida*

Chorizanthe brevicornu **Torr.** Short Spine-flower. Plants erect or ascending, mainly 5–28 cm tall; stems usually several from the base, strigulose, breaking at the nodes when dry; leaves mostly basal, 1–6 cm long, 2–8 mm wide, narrowly oblanceolate, reduced to opposite bracts upward; involucres solitary in axils of branches, subcylindric, conspicuously 6-ridged, straight or curved, ca 4 mm long, the lobes with recurved spinose teeth; flowers 3–4 mm long, glabrous, the perianth lobes whitish, subequal; stamens 3; achenes ca 2 mm long. Creosote bush, blackbrush, and other warm and salt desert shrub communities at 760 to 1220 m in Grand, Kane, San Juan, and Washington counties; Nevada, Arizona, and California; 14 (iv).

Chorizanthe rigida **(Torr.) T. & G.** Rigid Spine-flower. [*Acanthogonium rigidum* Torr.]. Plants erect, mainly 2–9 cm tall;

Stems simple, obscured by bracts and leaf bases; main leaves long-petiolate, the blades 0.8–2 cm long and about as broad, oval to orbicular or obovate, woolly beneath, green and sparingly tomentose above; secondary leaves bracteate, lanceolate to subulate, spine-tipped, indurate and thorny at maturity; inflorescence dense, with involucres clustered in bract axils; tube of involucre ca 2 mm long, 3-angled, with 3 broad, spreading, unequal, straight, spine-tipped lobes 4–12 mm long; perianth yellowish, almost included; stamens 9; achenes ovoid, prominently beaked, ca 2 mm long. Creosote bush, Joshua tree, and other warm desert shrub communities at 760 to 1130 m in Washington County; Arizona, Nevada, California, and Mexico; 8 (i).

***Chorizanthe thurberi* (Gray) Wats.** Thurber Spine-flower. [*Centrostegia thurberi* Gray]. Plants erect, usually simple from the basal rosette and typically dichotomously branched upward, 4–16 cm tall; basal leaves 4–30 mm long, 3–6 mm wide, spatulate, subglabrous; foliar bracts 3-lobed, spine-tipped, 2–4 mm long; involucres solitary, borne in branch axils, 4–6 mm long, 5-toothed apically, the teeth armed with straight spines, 3-angled and with 3 saccate, spinose horns near the base; perianth included, pubescent; stamens 6 or 9; achenes ca 1.5 mm long. Creosote bush, blackbrush, mountain brush, and pinyon-juniper communities at 850 to 1700 m in Garfield (?), Kane, and Washington counties; Arizona, Nevada, and California; 12 (i). The report for Garfield County is based on a specimen collected "40 miles south of Boulder, in creosote bush," and might be mislabeled.

ERIOGONUM Michx.

Annual or perennial herbs, subshrubs, or shrubs; leaves basal or cauline and alternate, or with scalelike to foliaceous alternate or whorled bracts, entire, estipulate; flowers perfect or imperfect, borne in campanulate, obconic, or cylindric involucres; involucres 4- to 10-lobed or -toothed, or rarely in 2 whorls or 3 more or less distinct bracts, awnless, few to many flowered, sessile or stipitate; perianth petaloid, 6-segmented, in 2 series; flowers pedicellate, subsessile, or the base attenuated and stipelike; stamens 9, the filaments filiform; ovary 1-loculed, with 3 styles and capitate stigmas; achenes 3-angled or -winged. **Note:** This is a dual genus, consisting of annual species distinguished by minute diagnostic characteristics, and of perennial herbs, subshrubs, and shrubs that are connected through series of intermediates that defy segregation and construction of keys based on characters similar to those used in the annual species. Taxonomic problems are not easily resolved, and the approach presented below is only tentative.

REVEAL, J. L. 1967. Notes on *Eriogonum*—V. A revision of the *Eriogonum corymbosum* complex. Great Basin Nat. 27:183–220.

———. 1969. A revision of the genus *Eriogonum* (Polygonaceae). Unpublished dissertation. Brigham Young Univ. 546 p.

———. 1973. *Eriogonum* (Polygonaceae) of Utah. Phytologia 25:169–217.

REVEAL, J. L., AND B. J. ERTTER. 1976. Reestablishment of *Stenogonum* Nutt. (Polygonaceae). Great Basin Nat. 36:272–280.

HESS, W. J. and J. L. REVEAL. 1976. A revision of *Eriogonum* (Polygonaceae), Subgenus Pterogonum. Great Basin Nat. 36:281–333.

1.	Plants annual (except in some *E. inflatum*, q.v.), from slender taproots	Key I
—	Plants perennial herbs, subshrubs, or shrubs	2
2(1).	Plants definitely shrubby, the stems developed above ground level and with 1 to several elongated internodes	Key II
—	Plants acaulescent, or, if caulescent, the stems prostrate at ground level or the internodes very short and obscured by a tomentum	3
3(2).	Flowers with attenuated, stipelike bases; yellow to reddish yellow or cream; plants often with prostrate-spreading stems	Key III
—	Flowers not with stipelike bases, variously colored; plants seldom with prostrate-spreading stems	4

4(3). Plants pulvinate-caespitose, mound forming; inflorescences mainly 0.5–5 cm tall; leaves less than 1 cm long ..... Key IV
— Plants not simultaneously pulvinate-caespitose, mound forming, less than 5 cm tall, and with leaves less than 1 cm long ..... Key V

KEY I

Plants annual (except in some *E. inflatum*).

1. Involucres angled to strongly ribbed, usually tightly appressed vertically to the stems and always sessile 2
— Involucres smooth, not ribbed or angled, usually stipitate, or, if sessile, not vertically appressed to the stems 9

2(1). Leaves puberulent to villous beneath, but not tomentose 3
— Leaves tomentose, at least beneath 5

3(2). Cauline leaves more or less bracteate, the blades not well developed, soft-hairy; involucres 4-lobed; flowers white, suffused with red, glabrous or sometimes hispidulous, 1–1.8 mm long; plants of southwestern Utah .... *E. puberulum*
— Cauline leaves with well-developed blades, variously hairy; involucres 5-lobed; flowers variously colored, 1.5–2 mm long; distribution various 4

4(3). Outer perianth segments broadly obovoid, hooded, markedly ciliate, otherwise glabrous; plants of Kane and San Juan counties ..... *E. darrovii*
— Outer perianth segments oblong to ovate, not hooded or markedly ciliate, otherwise hispidulous and more or less glandular; plants of central and eastern Utah ..... *E. divaricatum*

5(2). Foliage leaves cauline and basal; plants of Kane and Washington counties ..... *E. polycladon*
— Foliage leaves all basal; plants variously distributed 6

6(5). Stems tomentose to floccose-tomentose 7
— Stems glabrous 8

7(6). Flowers yellow to red, the outer perianth segments broadly obovate ... *E. nidularium*
— Flowers white, the outer segments narrowly obovate ..... *E. palmerianum*

8(6). Involucres 3–5 mm long; achenes ca 2 mm long; plants of Washington County ..... *E. davidsonii*
— Involucres 1–2.5 mm long; achenes ca 1 mm long; plants of Beaver County ..... *E. baileyi*

9(1). Leaves glabrous or variously pubescent but not tomentose or lanate, even on the lower blade surface 10
— Leaves tomentose to lanate on the lower blade surface, at least 15

10(9). Involucres in 2 whorls, each whorl 3-lobed 11
— Involucre consisting of a single whorl, this usually 4- or 5-lobed 12

11(10). Foliage leaves all basal; peduncles abruptly bent above the middle ..... *E. flexum*
— Foliage leaves both cauline and basal; peduncles straight or gently curved ..... *E. salsuginosum*

12(10). Stems usually strongly inflated; plants of broad distribution, annual or perennial ..... *E. inflatum*
— Stems not inflated (except in some *E. trichopes*, q.v.); plants annual, of various distribution 13

13(12). Flowers glabrous, white, fading yellowish; plants of eastern Utah ..... *E. gordonii*
— Flowers hairy, yellowish or reddish; plants of western and southwestern Utah 14

14(13). Branches of inflorescence with stipitate, usually purplish glands; flowers densely villous; involucres 5-lobed; plants of western Utah ..... *E. howellianum*
— Branches of inflorescence not glandular; involucres 4-lobed; plants of Washington County ..... *E. trichopes*

15(9). Foliage leaves both cauline and basal 16
— Foliage leaves all basal (except in some *E. cernuum*, q.v.) 17

16(15). Flowers glabrous, yellow, the outer perianth segments cordate-ovate; leaves linear to narrowly oblanceolate ..... *E. pharnaceoides*
— Flowers minutely glandular-puberulent, white to yellowish or pink, the outer segments oval; leaves obovate to lanceolate ..... *E. maculatum*

17(15). Involucres minute, 0.3–1 mm long 18
— Involucres 1–3 mm long 20

18(17). Flowers yellow, soon suffused with red, glabrous; plants of southeastern Utah ... . *E. wetherillii*
— Flowers white to pink or yellow, hairy or glabrous; plants of southwestern Utah 19

19(18). Flowers yellow; outer perianth lobes with saccate-dilated bases, pubescent .... *E. thomasii*
— Flowers white to pink; outer perianth lobes not swollen at the base, pubescent or glabrous ..... *E. subreniforme*

20(17). Branches of inflorescence or stipes with dark, stipitate glands; plants of Washington County ..... *E. brachypodum*
— Branches of inflorescence or stipes glabrous (or tomentulose), or if stipes glandular (as in *E. nutans*), not of Washington County 21

21(20). Involucres and flowers puberulent and more or less glandular; plants of Washington County ..... *E. pusillum*
— Involucres and flowers glabrous (or tomentulose); plants variously distributed 22

22(21). Branches of inflorescence more or less tomentose (at least when young) and glandular; leaf margins conspicuously undulate-crisped; plants of eastern Utah . ..... *E. scabrellum*
— Branches of inflorescence glabrous; leaf margins not especially undulate; plants variously distributed 23

23(22). Outer perianth segments merely truncate to obtuse basally; involucres usually stipitate 24
— Outer perianth segments cordate at the base; involucres usually sessile 25

24(23). Stipes glabrous; outer perianth segments violin shaped, constricted below the middle, the margins undulate, more or less saccate below; plants common and widespread ..... *E. cernuum*
— Stipes stipitate-glandular; outer segments obovate, not constricted below the middle, the margins not especially saccate; plants uncommon ..... *E. nutans*

25(23). Involucres erect on branches of inflorescence; plants of Iron and Washington counties ..... *E. insigne*
— Involucres deflexed on branches of inflorescence; plants of various distribution 26

26(25). Involucres broadly campanulate, broader than long; flowers yellow to reddish yellow; plants widespread ..... *E. hookeri*

— Involucres obconic, somewhat longer than broad; flowers white to pink; plants of western and southern Utah ..... *E. deflexum*

KEY II

Plants definitely shrubby.

1. Flowers pubescent, white to pink; leaves fascicled in at least some axils; plants of Washington County ..... *E. fasciculatum*

— Flowers glabrous, variously colored; leaves fascicled or not; plants variously distributed 2

2(1). Stems angled or ribbed and more or less grooved, or conspicuously flexuous; plants of Washington County 3

— Stems rounded or terete and not especially, if at all, flexuous; plants variously distributed 4

3(2). Stems both flexuous and grooved, usually glabrous; involucres 0.7–1.5 mm long ..... *E. heermannii*

— Stems flexuous, almost terete, tomentose; involucres 2–2.5 mm long; plants not known in contemporary collections from Utah [*E. palmeri* Wats., type from Washington County] ..... *E. plumatella* Dur. & Hilg.

4(3). Plants completely glabrous; plants of Emery and Wayne counties ..... *E. corymbosum*

— Plants pubescent or tomentose, variously distributed 5

5(4). Leaves oval to oblong or elliptic, mostly less than 3 times longer than broad 6

— Leaves linear to narrowly oblong or narrowly elliptic, mostly 5–10 times longer than broad 9

6(5). Flowers not much exserted from the involucres; leaves typically densely tomentose on both surfaces; plants mainly of the Great Basin and western Kane and eastern Washington counties ..... *E. nummulare*

— Flowers conspicuously exserted from the involucres; leaves often only thinly tomentose above; plants of broad distribution 7

7(6). Inflorescences ca half as long as plant height, about equaling the leafy portion of current annual growth; involucres racemosely arranged; plants of Washington County ..... *E. wrightii*

— Inflorescences usually much less than one-forth the plant height; plants variously distributed 8

8(7). Leaf apices acute, the blades mostly elliptic and more or less revolute, mainly less than 8 mm wide; plants widespread ..... *E. microthecum*

— Leaf apices typically rounded, the blades orbicular to oblong or ovate to obovate, seldom, if at all, revolute, mainly more than 8 mm wide ..... *E. corymbosum*

9(5). Leaves flat, slightly, if at all, revolute 10

— Leaves revolute, the lower surface largely obscured by revolute margins 12

10(9). Plants semishrubby only; stems of current growth dying to plant base ... *E. brevicaule*

— Plants definitely shrubby; stems of current growth not dying to plant base each year 11

11(10). Leaves with margins at least somewhat revolute; plants broadly distributed ..... *E. corymbosum*

— Leaves mainly flat; plants of northern Uintah County ..... *E. lonchophyllum*

12(9). Inflorescences mainly 8–20 cm long or more; involucres racemose; plants of sandy tracts in the Navajo Basin ..... *E. leptocladon*

— Inflorescences mainly 1–6 cm high; involucres cymose; plants variously distributed, but usually not in deep sand 13

13(12). Plants low, mat forming; flowers bicolored, pink and white ..... *E. bicolor*

— Plants low to tall, but not mat forming; flowers white, pink, reddish, or yellow 14

14(13). Flowers yellow; plants of clay and silt substrates in eastern Grand County ..... *E. contortum*

— Flowers white, pink, or reddish; plants variously distributed 15

15(14). Leaf axils (at least some) with fascicled leaves; plants of San Juan County ..... *E. clavellatum*

— Leaf axils seldom with fascicled leaves (if ever); plants of various distribution 16

16(15). Leaves mainly 3–7 cm long; involucres clustered on inflorescence branch tips; plants of Duchesne County, and sometimes elsewhere ..... *E. corymbosum*

— Leaves mainly 0.8–3 cm long; involucres not clustered; plants widespread ..... *E. microthecum*

KEY III

Flowers with attenuated, stipelike bases.

1. Stems with whorled, foliose bracts near the middle; plants of northern Utah ..... *E. heracleoides*

— Stems lacking whorled bracteate leaves, or these closely subtending the plants inflorescences; variously distributed 2

2(3). Flowers glabrous ..... *E. umbellatum*

— Flowers hairy 3

3(2). Stems with whorled bracteate leaves subtending the umbellate inflorescence; involucres to 6 mm wide or more ..... *E. jamesii*

— Stems lacking whorled bracteate leaves subtending the capitate inflorescence; involucres to 3 mm wide ..... *E. caespitosum*

KEY IV

Plants pulvinate caespitose, mound forming; inflorescences less than 5 cm tall and leaves less than 1 cm long.

1. Leaf blades oval, almost or quite as broad as long ..... *E. ovalifolium*

— Leaf blades longer than broad 2

2(1). Scapes, if present, glabrous; plants of central and south central Utah . *E. panguicense*

— Scapes, if present, tomentose; plants of various distribution 3

3(2). Flowers glabrous, 2–3 mm long; plants of San Francisco Range ..... *E. soredium*

— Flowers hairy, mainly 2–4 mm long; distribution various 4

4(3). Ovaries and achenes pubescent; flowers white or yellow; plants of lower elevations in Great Basin and in eastern Utah ..... *E. shockleyi*

— Ovaries and achenes glabrous; flowers yellow, white, or pink; plants variously distributed 5

5(4). Heads 10–15 mm wide, usually evidently pedunculate, and definitely bracteate; plants mainly of the Great Basin ..... *E. villiflorum*

— Heads less than 10 mm wide, usually sessile and not evidently bracteate; plants of eastern and south central Utah 5

6(5). Flowers white to rose, 3.5–4 mm long; involucres 6- to 8-lobed; plants of eastern Utah ..... *E. tumulosum*

— Flowers yellow 1.8–2.5 mm long; involucre 4-lobed; plants of Garfield County ..... *E. aretioides*

KEY V

Plants herbaceous perennials with leaves more than 1 cm long and with stems or scapes more than 5 cm tall.

1. Caudex branches or root crown 1–2.5 cm thick, clothed with persistent leaf bases, these with persistent, coarse, villous-pilose hairs; plants wandlike, mainly 3–12 dm tall ..... *E. alatum*

— Caudex branches or root crown less than 1 cm thick, or, if thicker, not villous-pilose 2

2(1). Inflorescence racemose or paniculate, the involucres spaced along elongate, erect branches ..... *E. racemosum*

— Inflorescence cymose, the involucres clustered on short, spreading branches 3

3(2). Leaf blades all oval to orbicular and about as broad as long; inflorescence branching or capitate, but if the latter the inflorescence mostly 15–30 mm wide 4

— Leaf blades, at least some, much longer than broad, or, if as above, the inflorescence capitate and 5–14 mm wide 5

4(3). Involucres capitate; flowers white, pink, or yellow; plants widespread *E. ovalifolium*

— Involucres borne in open cymes; flowers white or pink; plants of central to western Utah ..... *E. batemanii*

5(3). Plants strictly acaulescent above caudex branches 6

— Plants short-caulescent, the internodes apparent, though short and obscured by dense tomentosum, or, if acaulescent, the inflorescence branched 7

6(5). Scapes glabrous; flowers white; plants mainly of southern highlands .. *E. panguicense*

— Scapes tomentose; flowers white, pink, cream, or yellow ..... *E. brevicaule*

7(6). Scapes or peduncles pubescent, or, if glabrous (as in some *E. spathulatum*), the plants of Beaver County 8

— Scapes or peduncles glabrous; plants variously distributed 9

8(7). Involucres capitate; plants of northern Utah ..... *E. brevicaule*

— Involucres in branching cymes or subcapitate; plants of central and western Utah ..... *E. spathulatum*

9(7). Flowers yellow; involucres not in capitate clusters; leaves linear to lanceolate or oblanceolate ..... *E. brevicaule*

— Flowers white or pink; leaves oblong to elliptic or ovate-lanceolate 10

10(9). Leaves broadly elliptic to ovate-lanceolate, the blades usually less than 3 times longer than broad ..... *E. batemanii*

— Leaves narrowly elliptic, commonly 5–8 times longer than broad .. *E. lonchophyllum*

Eriogonum alatum **Torr. in Sitgr.** Winged Buckwheat. [*E. triste Wats., type from Kane County; E. alatum* ssp. *triste* (Wats.) Stokes]. Perennial herbs, mainly 3–12 dm tall, from a taproot and thick rootcrown, this 1–3 cm thick or more and clothed with persistent, coarsely villous pilose leaf bases, the pith chambered; leaves mainly 3–12 (20) cm long, 3–15 mm wide, narrowly oblanceolate to lanceolate, strigose on one or both surfaces; cauline leaves reduced upward; inflorescence cymose-paniculate; stipes erect, 3–20 mm long; involucres obconic to campanulate, 2–4.5 mm long, pilosulose to glabrous, 5-lobed; perianth yellowish to greenish, 1.5–2.8 mm long, the segments oblong, united to about the middle; achenes 5–9 mm long, 3–6 mm wide, glabrous, 3-winged the entire length. Sagebrush, mixed desert shrub, pinyon-juniper, and mountain brush communities at 1155 to 2685 m in Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sevier, Uintah, Wasatch, and Wayne counties; Wyoming to Nebraska, south to Arizona, New Mexico, Texas, and Mexico; 66 (x).

Eriogonum aretioides **Barneby** Widtsoe Buckwheat. Pulvinate-caespitose, mound-forming, herbaceous perennials from a pluricipital caudex and woody taproot, the caudex branches mainly 20–50 the taproot clothed with shreddy castaneous to blackish bark; leaves 1–3.5 mm long, 0.8–1.2 mm wide, oblanceolate in outline, revolute, the lower surface obscured, white-pilose, sessile; inflorescence of solitary, sessile involucres, not borne above the rosettes, these campanulate, 2.8–3.2 mm long, 2–4 mm wide, villous, 4-lobed; flowers yellow, 2–2.2 mm long, pilose, the segments lance-ovoid; achenes brown, ca 2 mm long, glabrous. Bristlecone pine, ponderosa pine, Douglas fir, and Rocky Mountain juniper communities, on the Pink Limestone Member of the Wasatch Formation, at 2255 to 2655 m in Garfield (type from near Widtsoe) County; endemic; 5 (0).

Eriogonum baileyi **Wats.** Bailey Buckwheat. Annual herbs, mainly 10–30 cm tall; leaves all basal; blades orbicular or obovate, mainly 5–20 mm long and about as broad, tomentose on one or both sides; petioles 5–30 mm long; inflorescences much-branched, spreading; involucres sessile, subcylindric, 1.5–2.5 mm long, 5-lobed, glabrous, vertically appressed; flowers white to pink, 1.5–2 mm long, glabrous, the outer segments oblong to obovate, slightly constricted near the middle, the inner segments narrower; achenes brown, ca 1 mm long. Sagebrush-rabbitbrush and mountain mahogany communities at 1830 to 2200 m in Beaver County; Oregon and Idaho, south to Nevada and California; 2 (ii).

Eriogonum batemanii **Jones** Bateman Buckwheat. Perennial herbs, mainly 10–45 cm tall; leaves all basal; blades 1–3.5 cm long, 5–16 mm wide, oval, orbicular, elliptic, or lance-oblong, tomentose on one or both surfaces, flat marginally, obtuse to rounded apically; petioles 8–25 mm long; inflorescences usually glabrous, open, cymose-paniculate, the branches spreading-ascending; involucres sessile, clustered or solitary, narrowly campanulate or obconic, 2–4 mm long, with 5, hyaline, rounded lobes; flowers white, 1.5–2.8 mm long, glabrous, the outer segments obovate, the inner ones slightly narrower; achenes brown, 2.5–3 mm long. Three rather weak but geographically correlated varieties occur in Utah.

1.	Leaf blades mainly 2-3 times longer than broad; plants of eastern Utah ..... *E. batemanii* var. *batemanii*
—	Leaf blades about as broad as long; plants of western and central Utah 2
2(1).	Involucres capitate, mainly 2–5, terminating long naked branches; plants of western Millard and Beaver counties ..... *E. batemanii* var. *eremicum*
—	Involucres cymose, mainly 1–5 in branching terminal cymes on rather short branches; plants of Piute and Sevier counties ..... *E. batemanii* var. *ostlundii*

Var. *batemanii* Mixed desert shrub and pinyon-juniper communities at 1615 to 2515 m in Carbon (type from Price Valley), Duchesne, Emery, Garfield, and Uintah counties; Colorado; 41 (viii). This is a Colorado Plateau endemic. Plants with both capitate

and cymose involucres in the branched inflorescences and very short broad leaf blades occur in this entity. Thus, the variation is similar to that represented in the two following varieties, which are distinguished on features not exclusive with them. A specimen from Horn Mountain, Emery County (Foster 8257 BRY), simulates *E. lonchophyllum* var. *lonchophyllum*, and suggests a relationship between *E. batemanii* and that taxon.

Var. *eremicum* (Reveal) Welsh comb. nov. [based on: *E. eremicum* Reveal Phytologia 23: 165. 1972]. Hermit Buckwheat. Shadscale, desert shrub, and juniper communities at 1555 to 1925 m in Beaver and Millard (type from SE of Garrison) counties; endemic; 12 (viii). Substrates include limestone and dolomite. Specimens herein assigned to *E. spathulatum* (q.v.), but having glabrous inflorescences, appear to be intermediate toward this variety.

Var. *ostlundii* (Jones) Welsh comb. nov. [based on: *E. ostlundii* Jones Contr. W. Bot. 11: 12. 1903; *E. spathuliforme* Rydb., type from Piute County]. Elsinore Buckwheat. Shadscale, mixed desert shrub, juniper, and ponderosa pine communities, often on igneous gravels, at 1675 to 1985 m in Piute and Sevier (type from near Elsinore) counties; endemic; 27 (iii).

***Eriogonum bicolor* Jones** Pretty Buckwheat. [*E. microthecum* ssp. *bicolor* (Jones) Stokes]. Mound-forming shrubs, mainly 2–8 cm tall, the horizontal spreading stems mainly 5–20 cm long; leaves caulescent, mostly 5–15 mm long, 1–3 mm wide, clavate, the lower surface more or less obscured by revolute margins, tomentose; current stems white-tomentose; inflorescence umbellate-cymose, on peduncles 3–15 mm long; involucres obconic to broadly campanulate, 2–4 mm long, tomentose to glabrous, with 5 acutish to rounded lobes; flowers white to pink or rose, the midveins often pink to red-purple, 2.2–4 mm long, glabrous, the outer segments obovate to orbicular, the inner ones oblanceolate to elliptic; achenes brown, 3–3.5 mm long. Shadscale, mat-atriplex, other salt and mixed desert shrub, and pinyon-juniper communities at 1340 to 1985 m in Carbon, Emery, Garfield, Grand (type from Thompsons Springs), San Juan, Sevier, and Wayne counties; endemic; 54 (vi).

***Eriogonum brachypodum* T. & G.** Parry Buckwheat. [*E. parryi* Gray, type from St. George; *E. deflexum* ssp. *parryi* (Gray) Stokes; *E. deflexum* var. *brachypodum* (T. & G.) Munz; *E. deflexum* ssp. *brachypodum* (T. & G.) Stokes]. Annual herbs, mainly 5–30 cm tall; leaves all basal, the blades 0.8–4 cm long and about as wide or wider, orbicular to reniform, white-tomentose, at least beneath; inflorescences umbellate, the branches glandular; involucres on stipes 3–15 mm long, usually deflexed, glandular; involucres 1–2.5 mm long, obconic to campanulate, usually glandular, with 5 triangular-acute teeth; flowers white or suffused with red, 1.5–2.8 mm long, glabrous, the outer segments ovate-cordate, the inner ones oblanceolate; achenes brown, 1.5–2 mm long. Creosote bush, other warm desert shrub, and shadscale communities at 760 to 1550 m in Sevier and Washington counties; California, Nevada, and Arizona; 16 (ii).

***Eriogonum brevicaule* Nutt.** Shortstem Buckwheat. Plants perennial; stems of the year dying to the base, mainly 3–40 cm tall, glabrous or tomentose; leaves all basal or some with obvious short stems, the short internodes obscured by a tomentum, 0.3–10 cm long, 1–9 mm wide, tomentose on one or both surfaces, flat to revolute, entire or undulate, linear to elliptic, oblanceolate, or lanceolate; petioles 1–40 mm long; inflorescences cymose, capitate, or cymose-umbellate; involucres solitary or clustered, obconic to campanulate, 1.5–4.5 mm long, tomentose to glabrous, with 5 acute lobes; flowers yellow to cream, white, or suffused with pink, glabrous, the segments ovate to oblong, lanceolate, oval, or obovate; achenes 1.5–3.5 mm long, brown. The *brevicaule* complex typifies the problematical nature of interpretation of perennial members of the genus. Floral morphology is sufficiently reduced and uniform as to lack definitive diagnostic criteria in most instances. Inflorescence structure is only somewhat more useful, but is often variable within a population, ranging from capitate to branched. Flower color is useful in a general sense only, often varying from white to yellow or even pink within a population. Pubescence appears, at first, to be of substantial value, but

the use of this criterion fails also. The attempt here is to bring together those members of the group as they occur in Utah, meanwhile acknowledging the problems of recognition of all specimens within a constituent entity. Further, an indication of intermediacy, whether phenotypic, due to ecological response, or genotypic, due to hybridization, is presented. Phenotypic variation in response to different, often subtle, environmental conditions are apparently great. However, some part of the variation is due to hybridization of phases of this complex among themselves and with phases of the *E. corymbosum*, *E. lonchophyllum*, *E. microthecum*, and possibly other complexes. The following treatment should be regarded as tentative at best.

1. Inflorescences branched from well below the middle of the plant height; plants of the southern Uinta Basin ..... *E. brevicaule* var. *ephedroides*
— Inflorescence capitate and unbranched or branched from above the middle of the plant height (seldom below in some var. *viridulum*, q.v.) 2

2(1). Leaves revolute, the lower surface completely obscured by the margin; plants of the northern and western Uinta Basin ..... *E. brevicaule* var. *viridulum*
— Leaves revolute or flat, the lower surface readily apparent, or, if not, the plants of other distribution 3

3(2). Leaves both flat and scapes monocephalous; plants of northern Utah 4
— Leaves revolute, or, if flat, plants usually with a branching inflorescence 5

4(3). Plants strictly acaulescent; plants of western Box Elder County ..... *E. brevicaule* var. *desertorum*
— Plants short-caulescent, the internodes obscured by a white tomentum; plants of Cache, Morgan, and Rich counties ..... *E. brevicaule* var. *loganum*

5(3). Plants with a definitely woody caudex, this clothed with black, marcescent leaf bases; leaves usually undulately partially revolute; typically growing in crevices or ridge crests ..... *E. brevicaule* var. *nanum*
— Plants with subligneous caudex, this only sometimes with blackish marcescent leaf bases; leaves various, but sometimes as above; of various habitats 6

6(5). Stems glabrous, the inflorescences branching in the upper one-third to one-forth; plants transitional with the following ..... *E. brevicaule* var. *brevicaule*
— Stems tomentose, or, if glabrous, inflorescence branching in the upper one-fourth 7

7(6). Flowers white, suffused with pink, or yellow, borne in capitate or branched inflorescences; plants of Minnie Maud Creek and Mt. Bartles vicinity ..... *E. brevicaule* var. *promiscuum*
— Flowers usually yellow, borne in capitate or branched inflorescences; plants broadly distributed ..... *E. brevicaule* var. *laxifolium*

Var. *brevicaule* [*E. campanulatum* Nutt.; *E. confertiflorum* var. *stansburyi* Benth. in DC., type from Utah; *E. brevicaule* var. *aureum* Benth. in DC.; *E. nudicaule* ssp. *garrettii* Stokes, type from near Echo Reservoir; *E. nudicaule* ssp. *parleyense* Stokes, type from Parleys Canyon]. Sagebrush, juniper, mountain brush, pinyon-juniper, aspen, and spruce-fir communities at 1460 to 2745 m in Daggett, Davis, Salt Lake, Summit, and Utah counties; Idaho, Wyoming, and Colorado; 60 (viii). This variety, as interpreted here, includes var. *wasatchense* (Jones) Reveal [*E. wasatchense* Jones, type from American Fork Canyon], a narrow-leaved phase completely transitional with more typical var. *brevicaule* northward. The narrow-leaved phase is also transitional with var. *laxifolium* (q.v.) southward, and both varieties *brevicaule* and *laxifolium* intergrade upward with the aggrega-

tion of forms treated herein as var. *nanum* (q.v.). Hybrids between var. *brevicaule* and *E. corymbosum* are known from Wyoming.

Var. *desertorum* (Maguire) Welsh comb. nov. [based on: *E. chrysocephalum* ssp. *desertorum* Maguire in Maguire & Holmgren Leafl. W. Bot. 3: 11. 1941; *E. desertorum* (Maguire) R. J. Davis]. Desert Buckwheat. Sagebrush, bitterbrush, and juniper communities at ca 1585 to 2440 m in Box Elder County; Nevada; 3 (0). This variety simulates the capitate phase of var. *laxifolium* differing conspicuously only in the flat leaf blades.

Var. *ephedroides* (Reveal) Welsh comb. nov. [based on: *E. ephedroides* Reveal Madrono 19: 295. 1968]. Ephedra Buckwheat. Shadscale, thistle, mixed desert shrub, and open pinyon-juniper communities, on Green River Formation, at 1525 to 2075 m in Uintah (type from south of Bonanza) County; endemic; 28 (iii). This most distinctive phase of the *brevicaule* complex forms apparent hybrids with *E. corymbosum* in the eastern part of its range.

Var. *laxifolium* (T. & G.) Reveal Varying Buckwheat. [*E. kingii* var. *laxifolium* T. & G, type from Wasatch Mts.; *E. chrysocephalum* Gray; *E. chrysocephalum* var. *angustum* Jones, type from Johnson Pass, Tooele County; *E. nudicaule* ssp. *angustum* (Jones) Stokes; *E. brevicaule* var. *pumilum* Stokes ex Jones, type from Carbon County; *E. nudicaule* ssp. *pumilum* (Stokes) Stokes; *E. tenellum* ssp. *cottamii* Stokes, type from Utah County; *E. brevicaule* var. *cottamii* (Stokes) Reveal; *E. medium* Rydb, type from Mt. Nebo]. Mountain brush, sagebrush, pinyon-juniper, ponderosa pine, and aspen communities at 1645 to 3390 m in Duchesne, Emery, Juab, Millard, Salt Lake, Sanpete, Sevier, Tooele, and Utah counties; endemic; 64 (xv). This variety consists of plants with both capitate and open inflorescences, slender to broad leaves, revolute to flat leaves, usually tomentose (but sometimes glabrous) inflorescences, and other diversity. The var. *cottamii* is based on the densely tomentose plants of western ranges, but these are transitional completely at higher elevations with other phases of var. *laxifolium*, and show affinity with *E. spathulatum* (q.v.) downward. Apparent hybrids occur with *E. lonchophyllum* (see var. *promiscuum*).

Var. *loganum* (A. Nels.) Welsh comb. nov. [based on: *E. loganum* A. Nels. Bot. Gaz. 54: 149. 1912; *E. chrysocephalum* ssp. *loganum* (A. Nels.) Stokes]. Logan Buckwheat. Sagebrush-bunchgrass communities at 1460 to 2045 m in Cache (type from Logan), Morgan, and Rich counties; endemic; 8 (0). This material differs only superficially from var. *nanum*, a higher-elevation phase with similar well-developed woody base.

Var. *nanum* (Reveal) Welsh comb. nov. [based on: *E. nanum* Reveal Phytologia 25: 194. 1973; *E. grayi* Reveal, type from Lake Blanche, Salt Lake County]. Dwarf Buckwheat. Sagebrush, mountain brush, spruce-fir, and alpine tundra communities, in crevices in limestone or quartzite outcrops, or on windswept ridges or in talus slopes at 2010 to 3510 m in Box Elder (type from Willard Peak), Cache, Juab, Millard, Salt Lake, Tooele, Utah, and Weber counties; endemic; 35 (i). This assemblage consists of crevice plants and other dwarf, high elevation phases that apparently do not have genetic integrity. Their recognition at any taxonomic rank is, therefore, problematical, and they are treated here for convenience only.

Var. *promiscuum* Welsh var. nov. Similis *Eriogono brevicauli* var. *nano* in floribus varicoloribus — albis, roseis, vel flavis, inflorescentiis simplicibus vel furcatis et foliis involutis vel planis sed in foliis longioribus et revolutis consistans differt. TYPE. USA. Utah. Carbon County; T13S, R14E, S7, ca 25 mi E of Helper, summit of Mt. Bartles, 3060 m, open ridge top, Green River Formation, 10 Aug. 1977, S. Welsh & S. Clark 15905 (Holotype BRY; Isotypes 10, distributed previously as *Eriogonum*). Additional specimens: Utah. Carbon County; head of Harmon Canyon, ca halfway between Mt. Bartles and Nine Mile Canyon, 18 July 1978, E. Neese & L. England 6160, 6161, 6162, 6163, 6164 (all BRY); near head of Soldier Canyon, 12 Aug. 1967, S. Welsh & E. Christensen 6625, 6626 (BRY); do 15 Aug. 1966, N. H. Holmgren & J. L. Reveal 3015 (BRY); Duchesne County, Gate Canyon, Myton-Wellington road, 25 July 1978, J. S. Peterson & E. Neese 1286 (BRY). The Mt. Bartles buckwheat is similar in some respects with var. *nanum* but appears to have a separate origin. The plants seem to have arisen through hybridization of portions

of *E. brevicaule* var. *laxifolium* with *E. corymbosum* var. *hylophilum* and with a possible infusion of *E. lonchophyllum* var. *lonchophyllum*. Flowers are predominantly white suffused with pink, and in the upper elevational reaches have capitate inflorescences. Downward the inflorescences are branched and the plants are transitional to *E. corymbosum*. Yellow-flowered individuals give evidence of contribution from *E. brevicaule* var. *laxifolium*; 12 (iii).

Var. *viridulum* (Reveal) Welsh comb. nov. [based on: *E. viridulum* Reveal Proc. Utah Acad. Sci. 42: 287. 1966]. Duchesne Buckwheat. Pinyon-juniper, shadscale, and mixed desert shrub communities at 1555 to 2135 m in Duchesne (type from 8 mi E of Duchesne) and Uintah counties; endemic; 58 (v). Hybrids between var. *viridulum* and *E. corymbosum*, which simulate *E. corymbosum* var. *aureum*, are locally common in Duchesne and eastern Utah counties. They have been described as both *E. corymbosum* var. *albogilvum* Reveal (type from Indian Canyon) and *E. x duchesnense* Reveal (type from Indian Canyon); 18 (iii). The var. *viridulum* is closely allied to var. *ephedroides* standing about midway between that entity and var. *brevicaule*. There is an admitted close affinity with var. *laxifolium* westward. Some plants from near Split Mountain, Uintah County, are apparently transitional with *E. lonchophyllum* var. *saurinum* and *E. microthecum*.

***Eriogonum caespitosum* Nutt.** Mat Buckwheat. Plants perennial, matforming, mainly 1–4 dm across, the vegetative stems persistent, with branches woody and usually clothed with gray to black leaves and bases; flowering stems scapose, arising from rosette-like branches, mainly 0.5–10 cm long or lacking; leaves 2–12 mm long, 1.5–5 mm wide, spatulate to oblanceolate, elliptic or oval, tomentose, flat or essentially so, short-petiolate; inflorescence capitate, not subbtended by bracts; involucres campanulate, with the tubes 2–3.5 mm long and 3–5 mm wide, the lobes oblong, 2–3.5 mm long; flowers yellow or suffused with red, 2.5–10 mm long including the stipitate base, pilose to villous, the segments oblanceolate; achenes 3.5–5 mm long. Sagebrush, pinyon-juniper, and mountain brush communities at 1525 to 2290 m in Beaver, Box Elder, Iron, Juab, Millard, Rich, Summit, and Washington counties; Oregon to Montana, south to California, Nevada, and Colorado; 21 (iv).

Eriogonum cernuum* Nutt.** Nodding Buckwheat. [*E. cernuum* var. *tenue* T. & G., type from Weber Valley; *E. cernuum* var. *umbraticum* Eastw., type from McElmo Creek, San Juan County]. Plants annual, becoming unbelliform, mainly 5–45 cm tall; leaves all basal or cauline up to 10 cm above the base, the blades 3–35 mm long and about as wide, ovate to oval or orbicular, tomentose on one or both sides; petioles 3–40 mm long; inflorescence glabrous, open, the branches spreading or ascending; involucres usually stalked (except in var. *vimineum*), often deflexed, obconic to campanulate, 1–2 mm long, glabrous, the 5 teeth acute; flowers white, 1–2.5 mm long, glabrous, the outer segments constricted below the middle, the margins undulate, often more or less saccate basally, the inner ones obovate; achenes 1.5–2 mm long. Shadscale, other salt desert shrub, sagebrush, pinyon-juniper, mountain brush, ponderosa pine, aspen, and spruce-fir communities at 1220 to 2810 m in Beaver, Carbon, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, Piute, Rich, Salt Lake, San Juan, Sevier, Tooele, Uintah, Utah, Washington, and Wayne counties; Canada south to California, Arizona, and New Mexico; 142 (xxvii). A phase with sessile involucres and somewhat larger flowers occurs in Millard and Beaver counties; i.e., var. ***viminale (Stokes) Reveal in Munz [*E. cernuum* ssp. *viminale* Stokes; 5 (0). A few plants from sandy sites in Kane County have inflorescences more paniculiform than usual and more uniformly short-stipitate involucres. Possibly they are of taxonomic significance.

Eriogonum clavellatum Small Comb Wash Buckwheat. Shrubs, mainly 7–20 cm tall, clump forming; leaves 3–15 mm long, 0.5–2 mm wide, narrowly oblanceolate to oblong, white-tomentose beneath, less densely so above, revolute, often with fascicled secondary ones in at least some axils; petioles very short; inflorescence cymose-umbellate, mainly 1–2.5 cm wide, glabrous; involucres on stipes mainly 1–4 mm long, glabrous, obconic to campanulate, 3.5–4.5 mm long, with

5-acutish teeth; flowers white or suffused with pink, glabrous, 3–3.5 mm long, the outer segments obovate to broadly spatulate, the inner ones narrower; achenes 3–3.5 mm long. Shadscale and blackbrush communities at ca 1325 to 1680 m in San Juan (type from Bartons range) County; endemic; 6 (i).

Eriogonum contortum **Small ex Rydb.** Grand Buckwheat. [*E. effusum* ssp. *contortum* (Small) Stokes]. Shrubs mainly 5–20 cm tall, clump-forming; leaves 5–20 mm long, 1–2 wide, linear to narrowly oblanceolate, revolute, tomentose on one or both sides; petioles very short; inflorescence cymose to cymose-umbellate, the involucres not clustered, tomentose to glabrous, involucres 1–2.5 mm long, obconic to campanulate, glabrous, the 5 teeth acutish; flowers yellow, 1.5–2.5 mm long, glabrous, the segments oblong to obovate; achenes 2–2.5 mm long. Shadscale and other salt desert shrub communities at ca 1280 to 1525 m in Grand County; Colorado; 8 (ii). This low shrub is allied to the *brevicaule* complex.

Eriogonum corymbosum **Benth.** Corymb Buckwheat. Low to tall shrubs or subshrubs, 0.7–12 dm tall, clump (seldom mat) forming; leaves 0.7–9 cm long, lanceolate to elliptic, orbicular, oblanceolate, spatulate, or linear, tomentose on one or both sides or glabrous, the margins flat to revolute; petioles 2–18 mm long; inflorescences cymose, the branches ascending to spreading or divaricate, glabrous or tomentose; involucres 1.5–4 mm long, obconic or campanulate, glabrous or tomentose, with 5 or 6 acute teeth; flower white, suffused with pink or red or yellow, 1.5–4.5 mm long, glabrous, the segments obovate to lanceolate or spatulate; achenes 2–3 mm long. This is a huge and complex species group, involving numerous morphological variants, some of which are edaphically and geographically correlated. Diagnostic criteria are few, and are often based on vegetative characteristics that form continuous clines. The species is pivotal to *E. thompsonae*, *E. lonchophyllum*, *E. leptocladon*, and *E. brevicaule*, forming hybrids with all of them. At the margins of ecological tolerance the species undergoes reduction of internode length and concurrent elongation of the inflorescence. Yellow flowers are apparently derived, at least in part, from hybridization with other species having yellow flowers (see *E. x duchesnense* under *E. brevicaule*, and both *E. thompsonae* and *E. leptocladon*). The following treatment is preliminary, but allows recognition of the more important phases of the complex. There are other forms, possibly ecotypes or incipient ecotypes, that might be worthy of recognition, but those must await more definitive work.

1. Internodes of annual growth short, the inflorescence usually much longer than the vegetative branch 2
— Internodes of annual growth elongate, the inflorescence subequal to or shorter than the vegetative branch 4

2(1). Inflorescence tomentose; plants of the Sevier River drainage, Sink Valley, and Thousand Lake Mt. ..... *E. corymbosum* var. *revealianum*
— Inflorescence glabrous; plants of various distribution 3

3(2). Leaves crenately revolute; plants of the Henry Mts. .. *E. corymbosum* var. *cronquistii*
— Leaves flat or essentially so, the margins not especially crenate or revolute; plants of San Juan County ..... *E. corymbosum* var. *humivagans*

4(1). Flowers yellow or pale yellow 5
— Flowers white or variously suffused with pink or red 6

5(4). Leaves glabrous on both surfaces; inflorescences glabrous; plants of southeastern Emery and eastern Wayne counties ..... *E. corymbosum* var. *smithii*
— Leaves tomentose on one or both surfaces; inflorescences glabrous or tomentose; plants of different distrubution ..... *E. corymbosum* var. *aureum*

6(4). Leaf blades as long as broad or nearly so; plants forming clumps mainly 6–20 dm broad; inflorescence intricately and divaricately branched; plants often of rimrock along the canyons of the Colorado River .... *E. corymbosum* var. *orbiculatum*

— Leaf blades much longer than broad; plants mainly less than 6 dm wide; inflorescence with branches not especially divaricate or sometimes so, but then of different substrates and distribution 7

7(6). Leaves mainly 3–9 cm long, more or less revolute, but not especially crenate-revolute; plants of southeastern Duchesne County .... *E. corymbosum* var. *hylophilum*

— Leaves mainly 0.5–4.5 cm long, usually crenate-revolute, less commonly flat; plants widespread ..... *E. corymbosum* var. *corymbosum*

Var. *aureum* (Jones) Reveal Golden Buckwheat. [*E. aureum* var. *glutinosum* Jones; *E. fruticosum* var. *glutinosum* (Jones) A. Nels.; *E. fruticosum* A. Nels.; *E. aureum* Jones, type from near St. George; *E. crispum* L. O. Williams, type from Cedar Canyon, Iron County]. Salt and mixed desert shrub and pinyon-juniper communites at 1065 to 2565 m in Emery, Garfield, Kane, Washington, and Wayne counties; Arizona; 27 (v). It is doubtful whether the yellow-flowered material constitutes a taxon in the usual sense. The assemblage is held together by the feature of flower color alone, a character hardly viewed as reliable in some portions of the genus, and the plants are almost as variable as those of var. corymbosum, with which they are largely sympatric. Similar yellow-flowered plants from the Uinta Basin result from hybridization of *E. brevicaule* with *E. corymbosum*. Specimens from Washington County are transitional into *E. thompsonae* (see the Shivwits phase under that species).

Var. *corymbosum* [*E. corymbosum* var. *divaricatum* T. & G., type from Green River; *E. corymbosum* ssp. *divaricatum* (T. & G.) Stokes; *E. divergens* Small; *E. effusum* ssp. *corymbosum* (Benth.) Stokes; *E. effusum* var. *durum* Stokes, type from Sunnyside; *E. erectum* Reveal & Brotherson, type from west of Duchesne; *E. corymbosum* var. *velutinum* Reveal; *E. lancifolium* Reveal & Brotherson, type from east of Wellington; *E. corymbosum* var. *davidsei* type from Wellington]. Shadscale, other salt desert shrub, sagebrush, mixed desert shrub, and pinyon-juniper communities at 1400 to 2440 m, often on fine-textured or sandy soils, in Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sevier, Uintah, Wasatch, and Wayne counties; Colorado and Arizona; 178 (xxxv). This variety is pivotal between *E. brevicaule*, *E. lonchophyllum*, and other taxa.

Var. *cronquistii* (Reveal) Welsh comb. nov. [based on: *E. cronquistii* Reveal Madrono 19: 289. 1968]. Cronquist Buckwheat. Pinyon, holodiscus, rabbitbrush, and rock-spiraea communities at ca 2680 to 2715 m in the Henry Mts., Garfield County; endemic; 3 (0). A closely similar plant is known from Thousand Lake Mt., but is tomentose throughout, except for the flowers, and is here assigned to var. *revealianum*.

Var. *humivagans* (Reveal) Welsh comb. nov. [based on: *E. humivagans* Reveal Madroño 19:291. 1968]. San Juan Buckwheat. Woody aster, rabbitbrush, and pinyon-juniper communities at 1675 to 2105 m in San Juan (type from east of Monticello) County; endemic; 3 (i).

Var. *hylophilum* (Reveal & Brotherson) Welsh comb. nov. [*E. hylophilum* Reveal Great Basin Nat. 27:190. 1968]. Gate Canyon Buckwheat. Juniper and pinyon-juniper communities at 2040 to 2535 m in Duchesne (type from Gate Canyon) County; endemic; 6 (0). Materials included within this variety are intermediate between *E. brevicaule* var. *promiscuum* and *E. corymbosum*, var. *corymbosum* especially that phase called *E. lancifolium* (q.v.). The variety is also influenced more or less by *E. brevicaule* var. *laxifolium*.

Var. *orbiculatum* (Stokes) Reveal & Brotherson Rimrock Buckwheat. [*E. effusum* ssp. *orbiculatum* Stokes]. Eriogonum, mixed desert shrub, hanging garden, and pinyon-juniper communities, often on sandstone, at 1125 to 2200 m, in Emery, Garfield, Grand, Kane, San Juan, and Wayne counties; Arizona and New Mexico; 49 (xix). Materials designated as var. *velutinum* Reveal are transitional between var. *orbiculatum* and var.

corymbosum at least in Utah specimens.

Var. *revealianum* (Welsh) Reveal Reveal Buckwheat. [*E. revealianum* Welsh, type from south of Antimony]. Sagebrush, pinyon-juniper, and bristlecone pine communities at 2135 to 2745 m in igneous gravels or clay-silts in Garfield, Kane, Piute, and Wayne counties; endemic; 13 (v). A specimen from the south end of Thousand Lake Mt. (Atwood & Thompson 7645 BRY) is like var. *cronquistii* in habit, but has broader involucres and pubescence of var. *revealianum*. Specimens from Kane County indicate a possible relationship with *E. thompsonae*.

Var. *smithii* (Reveal) Welsh comb. nov. [based on: *E. smithii* Reveal Great Basin Nat. 27: 202. 1968]. Flat Top Buckwheat. Purple-sage, matchweed, ephedra-Indian ricegrass, and rabbitbrush communties, on the Entrada Formation and on stabilized dunes, at ca 1585 to 1710 m in Emery (type from the Big Flat Top) and Wayne counties; endemic; 12 (ii). This is the most striking phase within the *corymbosum* complex. Its origin is problematical, but the possibility of hybridization cannot be discounted. Putative hybrids between var. *corymbosum* and *E. leptocladon* (q.v.) suggest such a possibility.

***Eriogonum darrovii* Hook.** Darrow Buckwheat. Annuals, mainly 3–15 cm tall, usually branched from near the base; leaves mainly cauline, the blades 4–15 mm long, 3–13 mm wide, puberulent to villous-pilose on both sides, tomentose to ovate, elliptic or orbicular; inflorescences axillary; involucres sessile, campanulate, 2–2.5 mm long, pilose, with 5 lance-ovate lobes; flowers yellow or pink, 1–2.5 mm long, hairy near the base, the outer segments broadly obovate, hooded, and conspicuously ciliate, the inner ones narrower; achenes ca 1 mm long. Pinyon-juniper community at ca 1860 m in Kane County; Arizona and Nevada; 1 (0).

***Eriogonum davidsonii* Greene.** Davidson Buckwheat. [*E. baileyi* var. *davidsonii* (Greene) Jones; *E. mosestum* var. *davidsonii* (Greene) Jepson; *E. juncinellum* Gand.; *E. vimineum* ssp. *juncinellum* (Gand.) Stokes]. Annuals, 6–40 cm tall; leaves all basal (rarely some above the base), the blades 6–20 mm long and as wide or wider, orbicular, white tomentose beneath and above or glabrate above; petioles 3–20 mm long; inflorescences glabrous, the branches erect-ascending; involucres sessile or terminal, narrowly obconic, 2.5–5 mm long, glabrous, the 5 teeth acutish; flowers white to pink, 1.5–2 mm long, glabrous, the segments obovate to oblong; achenes ca 2 mm long. Creosote bush, Joshua tree, mixed warm desert shrub, and pinyon-juniper communities at 795 to 1680 m in Kane and Washington counties; California, Nevada, Arizona, and Mexico; 7 (0).

Eriogonum deflexum* Torr. in Ives** Skeletonweed Buckwheat. [*E. deflexum* var. *nevadense* Reveal]. Annuals, 5–40 (50) cm tall; leaves all basal; blades 6–30 (40) mm long and as wide or wider, orbicular to subreniform, rounded to cordate basally, tomentose on one or both sides; petioles 0.3–7 cm long; inflorescences usually spreading and umbrellalike, glabrous; involucres stipitate to subsessile or sessile, glabrous, deflexed, obconic to somewhat campanulate, mainly 1.5–2 mm long, the 5 teeth acutish; flowers white, sometimes pinkish, 1–2 mm long, glabrous, the outer segments cordate, the inner ones narrower; achenes 1.5–2 mm long. Creosote bush, Joshua tree, blackbrush, other warm desert shrub, shadscale, and juniper communities at 760 to 1985 m in Garfield, Juab, Kane, Millard, San Juan, Washington, and Wayne counties; Nevada, Arizona, California, and Mexico; 39 (xiii). This species is a close ally of *E. hookeri*, *E. brachypodium*, and *E. insigne*, all of which have been included previously within an expanded *E. deflexum*. Some specimens from Washington County have strict branches like *E. insigne*, but are otherwise *E. deflexum*. I follow recent tradition in treating the taxa as separate species. The var. *nevadense*, in Utah at least, lacks both geographical and morphological continuity. Our material belongs to **var. *deflexum.

***Eriogonum divaricatum* Hook.** Spreading Buckwheat. Annuals, prostrate to decumbent-ascending, the stems 5–22 cm long, dichotomously branched; leaves cauline and basal, the blades 3–30 mm long, 3–20 mm wide, oval to orbicular, puberulent with crinkly hairs; involucres sessile, borne in axils of bracteate leaves on spreading-decurved branches, obconic, 1–2 mm long, pilose, 5-lobed; flowers yellowish or suffused with red,

1–2 mm long, puberulent and glandular, the segments oblong to lanceolate; achenes 1.5–2 mm long. Shadscale, mixed desert shrub, and pinyon-juniper communities at 1155 to 2015 m in Emery, Garfield, Millard, San Juan, Uintah, and Wayne counties; Wyoming, Colorado, New Mexico, and Arizona; 12 (i).

***Eriogonum fasciculatum* Benth.** Mojave Buckwheat. Shrubs, mainly 2–8 dm tall, clump-forming; leaves cauline, often with some fascicled ones in lower axils, 4–18 mm long, 1–5 mm wide, usually more or less revolute, linear to narrowly oblong or oblanceolate, more or less tomentose on one or both sides; inflorescences long-peduncled, divarcately branched or subcapitate, tomentulose; involucres obconic to campanulate, 2–3.5 mm long, the 5 obtusish lobes with hyaline margins; flowers white to pink, 2–3 mm long, villous-pilose, the segments obovate; achenes 2–2.5 mm long. Warm desert shrub communities at 730 to 1495 m in Washington County; Nevada, California, Arizona, and Mexico; 25 (i). Our material has been assigned to var. ***polifolium* (Benth.) T. & G.** [*E. polifolium* Benth. in DC.]. A specimen with provenience of Emery County (Cottam 5224A BRY) is extant, but might be mislabeled.

***Eriogonum flexum* Jones.** Bent Buckwheat. [*E. flexum* var. *ferronis* Jones, type from near Ferron; *Stenogonum flexum* (Jones) Reveal & Howell]. Annuals, 4–35 cm tall; leaves all basal (rarely some whorled at nodes of inflorescence); blades 3–28 mm long and about as wide, orbicular to oval, truncate to subcordate basally, puberulent to glabrous and sometimes glandular on one or both surfaces; petioles 3–40 mm long; involucres stipitate, the filiform stipes commonly abruptly bent below the involucre and often glandular below, campanulate, in 2 whorls, each 3-lobed; flowers yellow, 1.5–4 mm long, puberulent, the segments lanceolate; achenes 2–2.5 mm long. Shadscale, mat-saltbush, blackbrush, and pinyon-juniper communities, often on fine-textured substrates, at 1430 to 1865 m in Carbon, Emery, Garfield, Kane, San Juan, Uintah, and Wayne counties; Colorado and Arizona; 34 (iii). Although regarded by some workers as belonging, with *E. salsuginosum*, in the segregate genus *Stenogonum* because of their peculiar involucres, both species appear to be more nearly allied to species within *Eriogonum* proper than they are to each other (see *E. inflatum*).

***Eriogonum gordonii* Benth. in DC.** Gordon Buckwheat. Annuals, mainly 8–60 cm tall; leaves all basal; blades 9–55 mm long, oval to suborbicular, obtuse to truncate or cordate basally, green above, paler beneath, softly spreading-hairy; petioles 0.5–10 cm long or more; inflorescences spreading-ascending, glabrous or hairy; involucres on stipes mainly 3–20 mm long, obconic-campanulate, 0.6–1.3 mm long, glabrous, with 5 obtusish teeth; flowers white, 1–2.5 mm long, glabrous, the segments obovate to oblong or oblanceolate; achenes 1.8–2.5 mm long. Salt desert shrub, shadscale, and juniper or pinyon-juniper communities, on fine-textured saline soils, at 1110 to 2015 m in Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Kane, and Uintah counties; Wyoming to Nebraska, south to Arizona, and New Mexico; 49 (vi).

***Eriogonum heermannii* Dur. & Hilg.** Heermann Buckwheat. Shrubs, mainly 1–6 dm tall, clump forming, with intricately and divaricately branched inflorescences appearing cushionlike; leaves mainly 3–17 mm long, 2–5 mm wide, the blades elliptic to spatulate, tomentose on one or both sides, more or less revolute; petioles 3–10 mm long; inflorescence cymose, the branches angled or ribbed and sulcate between the ribs; involucres sessile, glabrous, campanulate, 0.6–1.5 mm long, with 5 rounded teeth; flowers white (yellowish?), 1.5–3 mm long, glabrous, the outer segments obovate, the inner ones narrower; achenes 2–2.5 mm long. Blackbrush, mixed desert shrub, mountain brush, and pinyon-juniper communities (often on rock outcrops) at ca 1220 to 2135 m in Washington County; Nevada, Arizona, and California; 10 (ii). All material from Utah examined by me belongs to var. ***sulcatum* (Wats.) Munz & Reveal** [*E. sulcatum* Wats., type from near St. George]. The var. ***subracemosum* (Stokes) Reveal** [*E. howellii* var. *subracemosum* Stokes] is present in the region also. It differs in having stems less angled and involucres more racemosely arranged.

Eriogonum heracleoides **Nutt.** Whorled Buckwheat. [*E. heracleoides* var. *utahense* Gandg., type from Cache County]. Perennial, mat-forming, mainly 2–6 dm across; vegetative stems persistent, the branches woody and more or less clothed with persistent, gray to brown or blackish leaves and bases; flowering stems with whorled leaves near the middle, arising from rosettelike bases, mainly 1.5–5 dm tall; leaves 2–7 cm long, 3–15 mm wide, the blades elliptic to oblong or oblanceolate, tomentose on one or both sides, entire, flat or essentially so; petioles 3–30 mm long; inflorescences umbellate or twice umbellate, rarely capitate, tomentose; involucres sessile or on stipes to 40 mm long, obconic to campanulate, 4–10 cm long, the lobes subequal to the tube or longer; flowers white or cream (or yellow), 4–9 mm long, including the stipitate base, the segments spatulate to elliptic or oblong; achenes 2–5 mm long. Sagebrush, mountain brush, juniper, pinyon-juniper, Douglas fir, and aspen communities at 1310 to 3050 m in Box Elder, Cache, Daggett, Davis, Duchesne, Juab, Millard, Cache, Salt Lake, Sanpete, Summit, Tooele, Uintah, Utah, and Wasatch counties; Canada, south to California, Nevada, and Wyoming; 83 (ii). This plant forms putative hybrids with phases of *E. umbellatum*. A specimen with features of *E. heracleoides* but with yellow flowers (Neese 14148 BRY) might indicate hybridization.

Eriogonum hookeri **Wats.** Watson Buckwheat. [*E. deflexum* ssp. *hookeri* (Wats.) Stokes; *E. deflexum* ssp. *hookeri* var. *gilvum* Stokes, type from American Fork Canyon]. Annuals, mainly 8–60 mm tall; leaves all basal; blades mainly 10–50 mm long and as broad or broader, orbicular to reniform, tomentose on both sides, obtuse to cordate basally, flat to undulate; inflorescences glabrous, umbrellalike; involucres sessile, deflexed, campanulate to hemispheric, 1–2 mm long, glabrous; flowers yellow, soon suffused with pink to dark red, 1.5–2.7 mm long, glabrous, the outer segments cordate, the inner ones narrower; achenes 2–2.5 mm long. Mixed desert shrub, sagebrush, pinyon-juniper, aspen, and spruce-fir communities at 1135 to 3050 m in Beaver, Box Elder, Carbon, Duchesne, Emery, Garfield, Iron, Juab, Millard, Piute, San Juan, Sevier, Tooele, Uintah, Utah (type from American Fork Canyon), and Wayne counties; Wyoming, Colorado, Arizona, Nevada, and California; 70 (xviii).

Eriogonum howellianum **Reveal** Howell Buckwheat. Annual, 5–30 cm tall, simple or branched from the base; leaves all basal; blades 6–25 (30) mm long and about as wide, oval to suborbicular, pubescent with long, soft, spreading hairs on at least the lower surface, obtuse to subcordate basally; petioles 3–40 mm long; inflorescences divaricately branched, the branches with scattered, stipitate, dark glands; involucres with filiform stipes 3–20 mm long or more, obconic to campanulate, glabrous, 1.3–2 mm long, usually 5-toothed; flowers yellowish or reddish, 1–2 mm long, the segments lanceolate, mostly obscured by spreading-villous hairs; achenes 1.5–2 mm long. Desert shrub, desert almond, and shadscale communities at 1460 to 1740 m in Juab, Millard (type from SE of Garrison), and Tooele counties; Nevada; a Great Basin endemic; 8 (i). This taxon is allied to *E. inflatum* and *E. flexum*.

Eriogonum inflatum **T. & G.** Bottlebush; Bottlestopper; Desert trumpet. Annual or perennial herbs, mainly 8–100 cm tall; leaves all basal; blades 4–30 mm long and about as wide or wider, orbicular to oblong or reniform, hirtellous on one or both sides, obtuse to cordate basally, entire to undulate-crisped; petioles 0.5–6 cm long; peduncles and usually the primary and secondary rays of inflorescence inflated, rarely not; inflorescence umbellate-cymose; involucres borne on glabrous, capillary to filiform stipes 5–45 mm long or more, obconic, 0.7–1.5 mm long, glabrous, the 5 lobes acutish; flowers yellow or reddish, 1–2.5 mm long, densely strigose, the segments lanceolate to ovate; achenes 2–2.5 mm long. Warm desert shrub, mixed desert shrub, salt desert shrub, and pinyon-juniper communities at 760 to 1955 m in Carbon, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Uintah, Washington, and Wayne counties; California, Nevada, Colorado, Arizona, New Mexico, and Mexico; 90 (xvii). Annuals within this species have been regarded as **var.** ***fusiforme*** **(Small) Reveal** [*E. fusiforme* Small], and perennials as **var.** ***inflatum***. The former occurs at the margins of the range of the latter, but is also sympatric.

The segregation appears to be moot, owing to the flowering of specimens of both phases during the initial year.

Eriogonum insigne Wats. Unique Buckwheat. [*E. deflexum* var. *insigne* (Wats.) Jones; *E. deflexum* ssp. *insigne* (Wats.) Stokes; *E. exaltatum* Jones; *E. deflexum* ssp. *exaltatum* (Jones) Stokes]. Annuals, mainly 8–100 cm tall; leaves all basal; blades 8–50 mm long (or more) and as wide or wider, orbicular to reniform, obtuse to cordate basally, tomentose on one or both sides; petioles 0.6–10 cm long; peduncles simple or branched from the base, inflorescences open cymose, the branches glabrous, erect to spreading; involucres sessile or with stipes to 6 mm long, obconic to campanulate, 2–3 mm long, glabrous, the 5 teeth obtusish; flowers white or suffused with pink, 1.5–2 mm long, glabrous, the outer segments cordate to oblong-cordate, the inner ones narrower; achenes 2–2.5 mm long. Creosote bush, other warm desert shrub, and mixed desert shrub communities at 730 to 1170 m in Iron (type from Red Creek) and Washington counties; California, Nevada, and Arizona; 6 (0).

Eriogonum jamesii **Benth. in DC.** James Buckwheat. Matforming perennials, mainly 1–6 dm wide; vegetative stems persistent, the branches woody, usually clothed with persistent, ashy to dark brown leaf bases; flowering stems subscapose, arising from rosettelike branches, mainly 6–30 cm long; leaves 1–9 cm long, 4–20 mm wide, the blades elliptic to obovate or ovate, tomentose on one or both sides, entire or undulate, flat or essentially so; petioles 0.5–6 cm long; inflorescences capitate or once or twice umbellate, tomentose, with foliose bracts at the nodes; involucres sessile, campanulate, 3–14 mm long, tomentose, the 5–8 teeth obtusish, erect to spreading; flowers yellow, 4–11 mm long, including the stipitate base, the segments spatulate to obovate; achenes 4–5 mm long. Sagebrush, mountain brush, pinyon-juniper, and ponderosa pine communities at 1585 to 2685 m in Carbon, Duchesne, Emery, Kane, San Juan, Sevier, Washington, and Wayne counties; Wyoming to Kansas, south to Arizona, New Mexico, Texas, and Mexico; 40 (viii). This is a remarkably beautiful species, with its bright sulphur-yellow flowers. The species varies from population to population, and specimens from Utah have been regarded as belonging to two varieties, although more segregation seems possible. Dwarf plants from Washington and adjacent Kane counties have pilose hairs over the tomentum on the upper leaf surfaces; they belong to **var. *rupicola*** **Reveal** (type from Zion National Park). The remainder of the Utah specimens are included within **var. *flavescens*** **Wats.**, but that taxon consists of variants of about equal value to var. *rupicola*. Specimens from San Juan County have capitate inflorescences, and material from western Emery County has huge involucres.

Eriogonum leptocladon **T. & G.** Sand Buckwheat. Shrubs, mainly 2–10 dm tall or more, clump forming; leaves often deciduous at anthesis, mainly 10–45 mm long, 2–10 mm wide, linear to narrowly lanceolate or oblanceolate, more or less revolute to flat, tomentose on one or both sides; petioles 1–6 mm long; inflorescences tomentose or glabrous, much longer than the vegetative stems; involucres cymose-racemose, sessile or nearly so, obconic to campanulate, 1.5–3 mm long, glabrous or tomentose, the 5 teeth acute to rounded; flowers yellow, yellowish, or white and often suffused with pink, 2–3.5 mm long, glabrous, the segments obovate; achenes 2.5–3.5 mm long. Three rather weak varieties are present.

1. Flowers yellow; plants of the central Canyonlands vicinity ..... *E. leptocladon* var. *leptocladon*
— Flowers white; plants sometimes distributed as above, or otherwise 2
2(1). Branches of inflorescence yellowish green, glabrous or rarely tomentose; plants of Garfield and Kane counties ..... *E. leptocladon* var. *papiliunculum*
— Branches of inflorescence green to gray-green, tomentose or glabrous; plants of broad or other distribution ..... *E. leptocladon* var. *ramosissimum*

Var. ***leptocladon*** [*E. microthecum* var. *leptocladon* (T. & G.) T. & G.; *E. effusum* ssp. *leptocladon* (T. & G.) Stokes; *E. effusum* ssp. *pallidum* var. *shandsii* Stokes, type from Indian Creek, San Juan County]. Purple-sage, ephedra, sand sagebrush, blackbrush, salt-

bush, and pinyon-juniper communities, usually in sand or on stabilized dunes, at 1340 to 1895 m in Emery, Garfield, Grand (type from Green River), San Juan, Sevier, and Wayne counties; endemic; 39 (x). This phase forms putative hybrids with *E. corymbosum* var. *corymbosum* (Neese 6829 -6833 BRY). The apparent backcrosses to *corymbosum* have broad leaves and yellowish flowers or are broad leaved and have white or pinkish flowers. The latter plants simulate var. *ramosissimum* and suggest at least one possible origin for that entity.

Var. *papiliunculum* Reveal Little-butterfly Buckwheat. Ephedra-vanclevea, sand sagebrush, other sand desert shrub, and juniper communities at 1400 to 1830 m in Garfield, Kane, San Juan, and Wayne counties; Arizona (?); 10 (ii). These plants have broader leaves than in var. *leptocladon* and yellowish green inflorescences. They are intermediate in most respects between var. *ramosissimum* and *E. corymbosum* with possibly both vars. *corymbosum* and var. *aureum* as contributors. Specimens transitional to both var. *ramosissimum* and *E. corymbosum* var. *aureum* are known.

Var. *ramosissimum* (Eastw.) Reveal Eastwood Buckwheat. [*E. ramosissimum* Eastw., type from near Butler Wash, San Juan County]. Vanclevea, yucca, purple-sage, sand sagebrush, blackbrush, and juniper communities at 1310 to 1770 m in Garfield, Kane, San Juan, and Wayne counties; Arizona, Colorado, and New Mexico; 14 (ii). This plant appears to be closely allied to *E. wrightii*, q.v.

***Eriogonum lonchophyllum* T. & G.** Longleaf Buckwheat. Subshrubs or shrubs, mainly 8–80 cm tall; vegetative branches with leaves all at base of current growth or with leaves separated by elongated internodes; leaves mainly 2–11 cm long, 2–12 mm wide, linear to elliptic, lanceolate, or oblanceolate, tomentose on one or both sides, margins entire to crenate, plane to revolute; petioles 3–20 mm long; peduncles and inflorescences glabrous or tomentose, cymose-corymbose to cymose-capitate; involucres usually sessile, obconic to campanulate, 2–4 mm long, glabrous, 5-lobed; flowers white, cream, or suffused with pink, 2–4 mm long, glabrous, the segments subequal; achenes 2.5–3.5 mm long. As is typical of other species complexes in the perennial versus shrubby species in *Eriogonum*, the *E. lonchophyllum* phases demonstrate genetic compatibility with members of other complexes. And, these likewise tend to precipitate out more or less uniform phases on distinctive soils or geologic substrates. Problems of interpretation of the distinctive groupings, their origins, and relationships are not made easier by the linear system of classification and nomenclature usual in plant taxonomy. Instead of taxa (both ecotypes and microspecies) being related by descent from a common ancestor, they might have resulted from a reticulate relationship involving two or more parental taxa. There are two more or less distinctive taxa in Utah that fall within the circumscription of *E. lonchophyllum*, as described above. In species of genera in other families these would be regarded as belonging to the same taxon, in a broad sense, but here they might have had separate origins. The following treatment is, therefore, tentative.

1. Plants acaulescent or essentially so, the internodes of vegetative stems very short; growing on ridge crests along the Tavaputs divide and elsewhere .... *E. lonchophyllum* var. *lonchophyllum*

— Plants definitely caulescent, the internodes of vegetative stems readily apparent; growing on Mowry Shale and closely adjacent strata in northern Uintah County ..... *E. lonchophyllum* var. *saurinum*

Var. *lonchophyllum* [*E. intermontanum* Reveal, type from the Roan Cliffs, Grand County]. Sagebrush, mountain brush, and Douglas fir communities, mainly on Green River and other calcareous formations] at 2285 to 2745 m in Emery, Grand, and Uintah counties; Colorado and New Mexico; 11 (ii). This variety forms intermediates with *E. corymbosum* downslope in Uintah County (the Rainbow phase); 21 (0). The apparent hybrids are transitional from one extreme to the other, with individuals simulating not only

var. *saurinum* but also the *E. lancifolium* and *E. corymbosum* var. *davidsei* phases o *E. corymbosum* var. *corymbosum* (q.v.). The similarity of this taxon to both *E. batemanii* var. *batemanii* and *E. spathulatum* is great. It is likewise similar to *E. brevicaule* through the var. *promiscuum*.

Var. *saurinum* (Reveal) Welsh comb. nov. [based on: *E. saurinum* Reveal Great Basin Nat. 27: 196. 1968]. Dinosaur Buckwheat. Eriogonum, juniper, serviceberry, pinyon-juniper, and ponderosa pine, mainly on Wasatch, Mowry, Curtis, Entrada, Carmel, and Moenkopi formations, at 1585 to 1895 m in northern Uintah (type from 10 mi E of Vernal) County; endemic; 33 (vi). Much of var. *saurinum* grows on the siliceous, acidic Mowry Shale Formation. That material, though variable, is the most uniform phase of the variety. Evidence exists that even the Mowry Shale phase is partially, at least, a product of introgression with *E. corymbosum*. On other formations adjacent to the Mowry Shale the plants vary from the type; e.g., in the Steinaker Reservoir area (Curtis, Entrada, and Carmel formations) the inflorescences are suggestive of those of *E. brevicaule* var. *viridulum* on the one hand and *E. microthecum* on the other; in the Asphalt Ridge (Wasatch Formation) vicinity the plants bear features of *E. corymbosum* and, in the Bourdette Draw vicinity (Moenkopi Formation), south of Blue Mountain, the plants again share features of *E. brevicaule*, in a broad sense. Though trends exist that indicate direct relationship with *E. lonchophyllum*, this variety might represent mainly recombinants of various *E. brevicaule* and *E. corymbosum* introgressants. More work is indicated.

Eriogonum maculatum **Heller** Spotted Buckwheat. [*E. angulosum* var. *maculatum* (Heller) Jepson; *E. angulosum* ssp. *maculatum* (Heller) Stokes]. Annuals, mainly 8–37 cm tall or more; leaves basal and cauline (foliose bracteate); basal leaf blades 5–25 mm long, 3–15 mm wide, oval to obovate or elliptic, tomentose on one or both sides; petioles 3–15 mm long; bracteate leaves reduced and becoming sessile upward; inflorescences tri- or dichotomous, tomentose; involucres on filiform stipes 5–30 mm long or more, broadly campanulate, 1–2.5 mm long, glandular-puberulent, with 5 broad teeth; flowers white to yellowish or pink, 1.5–2.8 mm long, glandular-puberulent, the outer segments ovate and cupulate, shorter than the slender inner ones; achenes 1–1.5 mm long. Creosote bush, Joshua tree, blackbrush, pinyon-juniper, live oak, and mixed desert shrub communities, at 730 to 1830 m in Box Elder, Juab, Millard, Tooele, and Washington counties; Washington and Idaho, south to California, Nevada, and Arizona; 25 (iv).

Eriogonum microthecum **Nutt.** Slender Buckwheat. Shrubs, mainly 4–100 cm tall, clump forming; leaves 4–35 mm long, 1–7 mm wide, elliptic to linear or oblanceolate, tomentose on one or both sides, the margins flat or revolute; petioles 1–5 mm long; inflorescences cymose, the branches ascending to spreading, glabrous or tomentose; involucres sessile to short-stipitate, obconic, 1–3.5 mm long, tomentose or glabrous, with 5 obtusish to rounded teeth; flowers white or suffused with pink, 2–3.2 mm long, glabrous, the segments obovate; achenes 2–3 mm long. Salt desert shrub, mixed desert shrub, sagebrush, pinyon-juniper, pondorosa pine, mountain brush, and white fir communities at 1125 to 2900 m in all Utah Counties (except Sanpete, Duchesne, Wasatch, Salt Lake, Davis, Weber, and Morgan); Washington to Montana, south to California, Nevada, Arizona, and New Mexico; 166 (xxxvi). There are two intergrading phases of this species in Utah, distinguished only by leaves being flat or revolute. The former have been designated as **var. *laxiflorum*** **Hook.** [*E. tenellum* var. *grandiflorum* Gand, type from Utah], and the latter as **var. *foliosum*** **(T. & G.) Reveal** [*E. effusum* var. *foliosum* T. & G.; *E. simpsonii* Benth. in DC.; *E. friscanum* Jones, type from Frisco; *E. nelsonii* L. O. Williams, type from Geyser Basin, San Juan County]. Specimens that are intermediate between *E. microthecum* and *E. brevicaule* are known (Neese 14531 a — c BRY), and likewise with *E. lonchophyllum* var. *saurinum* (Neese 8495 BRY). Despite its tendency to form intermediates with other taxa, the slender buckwheat is not known to hybridize with *E. corymbosum*, with which it is typically contrasted in keys. A report of *E. leptophyllum* (Torr.) Woot. & Standl. belongs here.

Eriogonum nidularium **Cov.** Birdnest Buckwheat. Annuals, mainly 5–20 cm tall, usually with erect-ascending branches from near the base; leaves all basal, 3–20 mm long and as wide, orbicular, tomentose on one or both sides; petioles 4–30 mm long; inflorescences densely branched, tomentose; involucres sessile, obconic, 0.6–1 mm long, appressed-erect, 5-toothed; flowers yellowish or reddish, 1.5–3 mm long, glabrous, the outer segments broadly obovate to flabellate, the inner ones narrower; achenes ca 1 mm long. Mixed desert shrub at ca 1065 to 1220 m in Washington County; Oregon to Idaho, south to California and Arizona; 3 (0).

Eriogonum nummulare **Jones** Coin Buckwheat. Shrubs or subshrubs, sprawling to erect, mainly 1–8 dm tall, clump forming; leaves 4–30 mm long, 4–17 mm wide, orbicular to elliptic, lanceolate, or obovate, tomentose on both surfaces, plane or undulare; petioles 1–15 mm long; inflorescences cymose or cymose-racemose, tomentose or glabrous, the branches erect-ascending or spreading; involucres sessile or on stipes 1–2 mm long, obconic, 1.5–3.5 mm long, tomentose or glabrous, 5-toothed; flowers white or suffused with pink, 1.5–3 mm long, the segments obovate to oblong; achenes 1.5–3.5 mm long. Two varieties occur in Utah.

1. Inflorescences glabrous; involucres narrowly obconic, glabrous; plants uncommon ..... *E. nummulare* var. *ammophilum*
— Inflorescences tomentose; involucres broadly obconic, tomentose; plants locally common ..... *E. nummulare* var. *nummulare*

Var. ***ammophilum*** **(Reveal) Welsh** comb. nov. [based on: *E. ammophilum* Reveal Phytologia 23: 163. 1972]. Ibex Buckwheat. Shadscale, horsebrush, winterfat, rabbitbrush, ephedra, and pinyon-juniper communities at 1460 to 1830 m in Millard (type from Ibex Warm Point) County; endemic; 8 (v). These plants are intermediate between *E. nummulare*, in a strict sense, and *E. batemanii* var. *eremicum*. They share the caulescent habit of the former with the glabrous inflorescences and involucres of the latter. The distribution is intermediate between the two.

Var. ***nummulare*** [*E. kearneyi* Tidestr., type from W of Tooele; *E. dudleyanum* Stokes, type from Skull Valley]. Fourwing saltbush, rabbitbrush, sagebrush, salt desert shrub, and juniper communities at 1095 to 1985 m in Juab, Kane, Millard, Tooele (type from Dutch Mountain), and Washington counties; California, Nevada, and Arizona; 30 (v). Specimens from sandy areas of eastern Tooele County (the *kearneyi* phase) south to Kane and Washington counties have leaves proportionally longer than broad, but the variation is continuous westward with more typical material.

Eriogonum nutans **T. & G.** Dugway Buckwheat. [*E. deflexum* ssp. *ultrum* Stokes, type from Sevier Valley; *E. rubiflorum* Jones, type from Dugway, Tooele County]. Annuals, mainly 5–30 cm tall; leaves all basal; blades 5–25 mm long and as wide or wider, orbicular to reniform, obtuse to cordate basally, tomentose on one or both sides; petioles 5–28 mm long; inflorescences more or less trichotomously branched, glabrous or more or less stipitate-glandular; involucres with slender stipes mainly 3–12 mm long, finally decurved, broadly campanulate, 2–3 mm long, more or less glandular, the 5 teeth with hyaline margins; flowers white or suffused with pink or red, glabrous, 2–3 mm long, the outer segments oblong-obovate, the inner ones narrower; achenes 1.5–2 mm long. Shadscale and sagebrush communities at ca 1525 to 1830 m in Beaver, Carbon, Sevier, and Tooele counties; Oregon and Nevada; 3 (i).

Eriogonum ovalifolium **Nutt.** Cushion Buckwheat. Pulvinate-caespitose, often mound-forming perennials, mainly 0.5–4 dm across; vegetative branches clothed with persistent, ashy to black leaf bases, terminated by rosettes of leaves; fertile stems scapose, 1–30 cm tall; leaf blades 2–6 cm long, 1–15 mm wide, tomentose on both surfaces, orbicular to elliptic, oblanceolate, or spatulate; petioles 1–50 mm long or more; inflorescences capitate, tomentose; involucres solitary or few to several, obconic to campanulate, 2–5.6 mm long, tomentose, with 5 teeth; flowers white, cream, yellow, or suffused with pink, red, or purple, 3–7 mm long, glabrous, the outer segments oval to orbicu-

lar, the inner ones narrower; achenes 2–3 mm long. Shadscale, bullgrass, winterfat, Grayia, sagebrush, pinyon-juniper, fringed sagebrush, and alpine meadow communities at 1370 to 3420 m in Beaver, Box Elder, Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, Salt Lake, San Juan, Sanpete, Sevier, Tooele, Uintah, Utah, Washington, Wayne, and Weber counties; Canada, south to California, Arizona, and New Mexico; 202 (xxv). This species has been treated as having three varieties in Utah; var. *ovalifolium* [*E. ovalifolium* var. *utahense* Gandg., type from Cache County?], with white or whitish flowers that ultimately turn pink, red, or purple; var. *multiscapum* Gandg., with yellow flowers; and var. *nivale* (Canby) Jones [*E. nivale* Canby], a dwarf, small-flowered plant of high elevations. The segregation has not proved to be more than arbitrary, with diagnostic features segregating specimens, not taxa.

Eriogonum palmerianum **Reveal in Munz** Palmer Buckwheat. [*E. plumatella* var. *palmeri* T. & G.; *E. baileyi* var. *tomentosum* Wats.]. Annuals, mainly 6–25 (30) cm tall; leaves all basal; blades 4–23 mm long and as wide or wider, orbicular to subreniform, obtuse to cordate basally, tomentose on one or both sides; petioles 3–40 mm long; inflorescences branched from near the base, tomentose, the branches often divaricate; involucres sessile, appressed, obconic, 1.2–2 mm long, tomentose, with 5 acute teeth; flowers white or pink, 1.5–2.4 mm long, glabrous, the outer segments broadly oblanceolate or obovate, the inner ones narrower; achenes 1.5–2 mm long. Blackbrush, shadscale, cheatgrass, rabbitbrush, desert almond, sagebrush, and pinyon-juniper communities at 1155 to 1985 m in Beaver, Box Elder, Garfield, Grand, Kane, Millard, San Juan, Sevier, Tooele, and Washington counties; Nevada to Colorado, California, Arizona, and New Mexico; 44 (x).

Eriogonum panguicense **(Jones) Reveal** Panguitch Buckwheat. [*E. pauciflorum* var. *panguicense* Jones, type from Panguitch; *E. spathulatum* var. *panguicense* (Jones) Stokes; *E. chrysocephalum* var. *alpestre* Stokes, type from Cedar Breaks; *E. panguicense* var. *alpestre* (Stokes) Reveal]. Pulvinate to caespitose perennial herbs, mainly 5–20 cm across; vegetative stems abbreviated, more or less clothed with ashy to black leaf bases and terminated by clustered leaves; flowering stems scapose, 2–30 cm long, glabrous; leaves 4–70 mm long, 2–8 (10) mm wide, linear to elliptic, oblanceolate, lanceolate, ovate, or obovate, obtuse to cuneate basally, plane or somewhat revolute; petioles 1–12 mm long; inflorescences glabrous, capitate or rarely branched; involucres sessile, several, obconic to campanulate, 2–3.7 mm long, the 5 teeth acute to obtuse; flowers white, often suffused with red, 2–3 mm long, glabrous, the segments oblong to lance-oblong; achenes 3–4 mm long. Pinyon-juniper, sagebrush, ponderosa pine, pygmy sagebrush, bristlecone pine, and spruce-fir communities, usually on limestone, at 1675 to 3355 m in Garfield, Iron, Kane, Sevier, and Washington counties; endemic; 48 (xi). This attractive buckwheat is closely allied to both *E. batemanii* and *E. spathulatum*, with whom it is partially sympatric. The species differs from both, however, in the usually unbranched inflorescences and smaller stature. It consists of a series of more or less disjunct populations growing on peculiar calcareous strata. Each population differs in subtle ways from all others, and, if one is chosen for varietal status, the remainder require similar recognition. The overall status, as a mosiac of variation, seems to dictate against recognition of infraspecific categories.

Eriogonum pharnaceoides **Torr. in Sitgr.** Wirestem Buckwheat. Annuals, mainly 6–30 cm long; leaves basal and cauline (foliose bracteate); blades 8–35 mm long, 1–6.5 mm wide, linear to narrowly oblanceolate, tomentose on one or both sides; petioles 1–5 mm long or lacking; inflorescences cymose, tomentulose; involucres on filiform stipes mostly 8–50 mm long, these often curved, campanulate, usually pilose, 3–4 mm long, with 5 oblong teeth; flowers yellow, 2–3 mm long, glabrous, the outer segments cordate and more or less cupulate, the inner ones narrower and surpassing the outer; achenes 1.5–2 mm long. Pinyon-juniper and ponderosa pine communities at ca 1830 to 2640 m in Iron and Washington counties; Nevada, Arizona, and New Mexico; 5 (0). Our material belongs to var. ***cervinum*** Reveal (type from Pine Valley Mts.).

Eriogonum polycladon **Benth. in DC.** Leafy Buckwheat. [*E. vimineum* ssp. *polycladon* (Benth.) Stokes]. Annuals, mainly 15–60 cm tall, the leafy stems erect; leaves basal and cauline; blades 6–18 mm long, 4–13 mm wide, obovate to elliptic, ovate, or suborbicular, tomentose on one or both sides; petioles 2–15 mm long; inflorescences tomentose, the branches erect-ascending; involucres sessile, appressed-erect, 1.5–2.5 mm long, glabrous or tomentose, with 5 obtuse teeth; flowers white or suffused with pink, 1.5–2.5 mm long, glabrous, the outer segments broadly obovate, the inner somewhat narrower; achenes 1–1.5 mm long. Sagebrush and pinyon-juniper communities at ca 1675 to 1830 m in Kane and Washington counties; Arizona, New Mexico, Texas, and Mexico; 6 (ii).

Eriogonum puberulum **Wats.** Red Creek Buckwheat. Annuals, mainly 4–30 cm tall; leaves basal and cauline (leafy bracteate); blades 2–15 mm long and about as wide, obovate to orbicular, puberulent to pilosulose on one or both sides; petioles 1–1.5 mm long; inflorescences puberulent, more or less dichotomously branched; involucres obconic, 0.6–1.5 mm long, mainly obscured by cupulate, long-lobed, nodal bracts, with 5 obtuse lobes; flowers white or suffused with red, 1.5–2.2 mm long, glabrous or scabrous, the segments oblong, sometimes somewhat cordate basally; achenes ca 1 mm long. Blackbrush, pinyon-juniper, mountain brush, and ponderosa pine communities at 1050 to 2745 m in Beaver, Iron (type from Red Creek), Millard, and Washington counties; Nevada; 7 (0).

Eriogonum pusillum **T. & G.** Slender Buckwheat. [*E. reniforme* ssp. *pusillum* (T. & G.) Stokes]. Annuals, 5–30 cm tall; leaves all basal; blades 3–20 mm long and about as wide, obovate to oval, tomentose on one or both sides; petioles 6–30 mm long; inflorescences more or less trichotomous, glabrous or the bracts glandular; involucres on slender, glabrous stipes 3–40 mm long, campanulate, 1–1.7 mm long, glandular-puberulent, the 5 lobes acute to obtuse; flowers yellow, 2–2.5 mm long, glandular-scaberulous, the segments oblong; achenes ca 1 mm long. Creosote bush and Joshua tree communities at ca 760 m in Washington County; Oregon and Idaho, south to California and Arizona; 1 (i).

Eriogonum racemosum **Nutt.** Redroot Buckwheat. Perennial, scapose or subscapose herbs, 16–100 cm tall, from a simple or branched caudex; leaves all basal or some foliose-bracteate ones at nodes of inflorescence; blades 10–100 mm long, 6–38 mm wide, elliptic, oblong, oval, or ovate, tomentose on one or both sides, obtuse to truncate or cordate basally; petioles 6–100 mm long or more; inflorescences often swollen below the nodes, simple or branched, the branches erect-ascending, tomentose or glabrous; involucres sessile, racemosely arranged, obconic to campanulate, 2–6 mm long, tomentose or glabrous, with 5 acute teeth; flowers white or suffused with pink, rose, or scarlet, 2.5–5.5 mm long, glabrous, the segments oblong or oblanceolate; achenes 3–4.5 mm long. Two varieties occur in Utah.

1. Flowering stems usually definitely swollen below the first branches of the inflorescence and often upward as well, glabrous or sometimes tomentose; plants of Kane and Washington counties ..... *E. racemosum* var. *zionis*
— Flowering stems not at all or only occasionally somewhat swollen, tomentose or occasionally glabrous; plants widespread ..... *E. racemosum* var. *racemosum*

Var. *racemosum* Sagebrush, pinyon-juniper, mountain brush, ponderosa pine, aspen, and spruce-fir communities at 1525 to 2745 m in Beaver, Cache, Davis, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, Piute, Salt Lake, San Juan, Sanpete, Sevier, Summit, Tooele, Utah, Washington, and Wayne counties; Nevada, Colorado, Arizona, and New Mexico; 108 (xiv).

Var. *zionis* (J. T. Howell) Welsh comb. nov. [based on: *E. zionis* J. T. Howell Leafl. W. Bot. 2: 253. 1940]. Zion Buckwheat. Mountain brush, juniper-manzanita, and ponderosa pine communities at 1340 to 1830 m in Kane and Washington (type from Zion National Park) counties; Arizona; 9 (v). Specimens are known that grade morphologically with var. *racemosum*; i.e., plants with

glabrous stems are essentially nonfistulose and some with fistulose stems are tomentose throughout. The phase with scarlet flowers from nearby in Arizona are very similar to specimens of var. *racemosum* with deep rose-colored flowers. The variety might ultimately be discovered in Utah, and is regarded herein as ***E. racemosum*** var. ***coccineum*** **(J. T. Howell) Welsh** comb. nov. [based on: *E. zionis* var. *coccineum* J. T. Howell Leafl. W. Bot. 2: 253. 1940].

Eriogonum salsuginosum **(Nutt.) Hook.** Smooth Buckwheat. [*Stenogonum salsuginosum* Nutt.]. Annuals, mainly 3–26 cm tall, clump-forming, 3–40 cm wide; leaves basal and cauline (foliose bracteate); blades 2–20 mm long, 2–12 mm wide, spatulate to oblanceolate, obovate, or linear, tapering to broad petioles 2–20 mm long or sessile, glabrous on both sides; inflorescence more or less dichotomous, glabrous or minutely glandular; involucres sessile or on stipes to 4 cm long, these curved-ascending, broadly campanulate, in 2 whorls, each 3-lobed; flowers yellow, 1.5–3 mm long, puberulent, the segments lanceolate; achenes 2–2.5 mm long. Shadscale, mat-atriplex, and pinyon-juniper communities at 1370 to 2760 m in Carbon, Daggett, Duchesne, Emery, Garfield, San Juan, and Uintah counties; Wyoming, Colorado, Nevada, Arizona, and New Mexico; 48 (viii).

Eriogonum scabrellum **Reveal** Westwater Buckwheat. Annuals, mainly 20–60 cm tall; leaves all basal, usually persistent at anthesis and beyond; blades 1–6 cm long and about as wide, orbicular to suborbicular, cordate basally, the margin strongly undulate-crisped, tomentose on one or both sides; petioles 8–50 mm long; inflorescences spreading-ascending to umbrellalike, tomentose and glandular; involucres sessile, erect or decurved, on usually decurved branchlets, obconic, 1.5–2.5 mm long, with 5 acute teeth; flowers white or suffused with pink or red, 1.5–2.2 mm long, the outer segments obovate, the inner ones narrower; achenes 1.8–1.8 mm long. Salt desert shrub communities at ca 1220 to 1740 m in Garfield, Grand (type from Westwater), Kane, and San Juan counties; Colorado and New Mexico; 7 (i).

Eriogonum shockleyi **Wats.** Shockley Buckwheat. [*E. pulvinatum* Small, type from Milford; *E. longilobum* Jones, type from near Price]. Pulvinate-caespitose, scapose, mound-forming perennials, mainly 2–5 cm tall, 5–40 cm across or more, from a woody, pluricipital caudex, the branches clothed with marcescent leaf bases and terminated by rosettes; leaf blades 2–12 mm long, 1–6 mm wide, obovate, oblanceolate, elliptic, or spatulate, tomentose on one or both sides; petioles 1–10 mm long, or lacking; inflorescences capitate; involucres sessile, campanulate, 2–6 mm long, tomentose, with 5 (or more) ovate to lanceolate lobes; flowers white, cream, yellow, or suffused with red, 2.5–4.5 mm long, pilose, the segments oblong to obovate; achenes 2.5–3.5 mm long. Blackbrush, shadscale, mixed desert shrub, sagebrush, and pinyon-juniper communities, often on fine-textured substrates, at 1280 to 1955 m in Beaver, Box Elder, Carbon, Daggett, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Millard, San Juan, Sevier, Tooele, Uintah, and Wayne counties; Idaho to Colorado, south to California, Arizona, and New Mexico; 107 (xv). Specimens from Utah have been treated in two varieties; i.e., var. *longilobum* (Jones) Reveal, with larger, more deeply cut involucres, occupying eastern Utah, and var. *shockleyi* with shorter, less deeply cut involucres, occupying western Utah. Some of the plants from eastern Utah do have large involucres, but many do not. A large number of plants from western Utah have yellow flowers, but very few from eastern Utah bear yellow flowers, indicating a difference in gene frequency. A conservative interpretation is indicated.

Eriogonum soredium **Reveal** Frisco Buckwheat. Densely matted, pulvinate-caespitose, scapose, mound-forming perennials, mainly 2–4 cm tall, 10–50 cm across, from a pluricipital caudex, the branches clothed with marcescent leaf bases and terminated by rosettes; leaves 2–5 mm long, 0.7–2 mm wide, elliptic to oblong, white-tomentose on both surfaces, revolute; petioles 0.6–3 mm long; inflorescences capitate, tomentose; involucres sessile, obconic, 1.5–2.5 mm long, obscured by a dense tomentum, with 4 or 5 teeth; flowers white or suffused with pink, 2–3 mm long, glabrous, the outer segments obovate, the inner ones narrower; achenes 2–2.5 mm

long. Sagebrush and juniper communities, on white limestone outcrops, at ca 2010 to 2230 m in Beaver County; endemic; 5 (ii).

Eriogonum spathulatum **Gray** Sevier Buckwheat. [*E. nudicaule* ssp. *ochroflorum* Stokes]. Perennial herbs, 10–40 cm tall, from a branching caudex; leaves subbasal, at least some internodes apparent, but obscured by a dense tomentum; blades 1–8 cm long, 3–15 mm wide, obovate to spatulate, elliptic, or linear, usually 1.5–5 times longer than wide or more, tomentose on one or both sides, acute to cuneate basally; petioles 3–30 mm long; inflorescences tomentose or glabrous, more or less trichotomous, the branches ascending; involucres sessile, clustered at branch ends, obconic, 2–4 mm long, tomentose or glabrous, with 5 acute teeth; flowers white or yellow, 2–3.5 mm long, glabrous, the segments oblong; achenes 2–3.5 mm long. Two more or less geographically correlated varieties are present.

1. Flowers yellow; leaf blades mainly less than twice as long as broad ..... *E. spathulatum* var. *natum*

— Flowers white, or rarely yellow; leaf blades usually more than twice longer than broad ..... *E. spathulatum* var. *spathulatum*

Var. ***natum*** **(Reveal) Welsh** comb. nov. [based on: *E. natum* Reveal in Welsh, Atwood, and Reveal Great Basin Nat. 35: 363. 1975]. Son Buckwheat. Shadscale community on ancient marly playa remnants at 1440 to 1500 m in Millard (type from 43 mi SW of Delta) County; endemic; 10 (ii).

Var. ***spathulatum*** [*E. nudicaule* ssp. *ochroflorum* Stokes, type from Clear Creek Canyon, Sevier County]. Greasewood, shadscale, rabbitbrush, ephedra, and pinyon-juniper communities at 1405 to 2135 m in Beaver, Millard, Sanpete, Sevier (type from Sevier River Valley), and Wayne counties; endemic; 47 (xiv). Both this and var. *natum* show affinities with *E. brevicaule* var. *laxifolium* (q.v.), especially through the densely hairy, low elevation *cottamii* phase, whose distribution is immediately adjacent to the north. The relationship is also through the *laxifolium* phase proper northeastward in Sanpete County. Plants with glabrous inflorescences and involucres from the vicinity of Frisco and the Shauntie Hills in Beaver County have about the same integrity as does var. *ammophilum* of the *E. nummulare* complex. Probably they have one parent in common, i.e., *E. batemanii* var. *eremicum*, but the other putative parent is different. These glabrous plants are similar to phases of *E. panguicense*, but the inflorescences are consistently branched.

Eriogonum subreniforme **Wats.** Stokes Buckwheat. [*E. filicaule* Stokes, type from Springdale]. Annuals, mainly 5–40 cm tall; leaves all basal; blades 4–30 mm long and about as broad or broader, orbicular to reniform, tomentose on one or both sides, truncate to cordate basally; petioles 6–60 mm long; inflorescence more or less trichotomous, glabrous, the branches ascending to spreading; involucres on filiform stipes mostly 3–25 mm long, glabrous, obconic, mostly 0.5–1 mm long, with 5 acute teeth; flowers white to rose, 1–2 mm long, glabrous or distinctly puberulent, the segments elliptic to lance-elliptic or spatulate; achenes 1.5–2 mm long. Creosote bush, shadscale, eriogonum, sagebrush, and pinyon-juniper communities at 850 to 1985 m in Garfield, Kane, and Washington (type from St. George) counties; Arizona and New Mexico; 17 (ii). Specimens from Garfield and Kane counties have glabrous flowers.

Eriogonum thomasii **Torr.** Thomas Buckwheat. [*E. minutiflorum* Wats.]. Annuals, mainly 5–30 cm tall; leaves all basal; blades 4–20 mm long and about as wide, orbicular to subreniform, tomentose on one or both sides, obtuse to subcordate basally; petioles 3–30 mm long; inflorescences more or less polychotomous, glabrous, the branches spreading to ascending; involucres on stipes mainly 3–30 mm long, glabrous, obconic to campanulate, 0.6–1.2 mm long, the 5 teeth obtuse; flowers yellow, 0.8–2 mm long, hispidulous near the base, the outer segments becoming saccate at maturity, the inner ones narrow and not saccate; achenes ca 1 mm

long. Creosote bush community at ca 850 to 915 m in Washington County; California, Nevada, Arizona, and Mexico; 6 (i).

Eriogonum thompsonae **Wats.** Ellen Buckwheat. [*E. corymbosum* var. *matthewsiae* Reveal, type from Springdale]. Perennial subshrubs or shrubs, mainly 2–8 dm tall, clump forming; leaves subbasal or definitely cauline; blades 10–60 mm long, 8–28 mm wide, oblong to elliptic, lanceolate or ovate, tomentose on one or both sides, the margins entire, flat or undulate and sometimes crisped; petioles 1.5–10 cm long; inflorescences more or less trichotomous, glabrous or less commonly tomentose, the branches spreading to ascending; involucres sessile, narrowly obconic, 2.5–3.8 mm long, glabrous or tomentose, the teeth rounded and more or less hyaline; flowers yellow or white, 2.5–4 mm long, glabrous, the segments oblong or obovate; achenes 2–3 mm long. Blackbrush, salt desert shrub, and pinyon-juniper communities, mainly on Chinle and Moenkopi formations, at 1125 to 1830 m in Kane and Washington counties; Arizona, a Mohave Strip endemic; 32 (iii). The *thompsonae* complex consists of a series of morphological subunits, each more or less distinctive, but only arbitrarily separable. They are based on application of the 2^n formula, where "n" equals the number of characters contrasted, i.e., yellow or white flowers with subscapose or caulescent habit. Plants with yellow flowers and subscapose habit are var. *thompsonae* (type from near Kanab); those with white flowers and subscapose habit are var. *albiflorum* Reveal (type from W of Virgin; *E. corymbosum* var. *matthewsiae*, in part); those with yellow flowers and caulescent habit are *E. corymbosum* var. *aureum*, in part (Shivwits phase); and those with white flowers and caulescent habit are *E. corymbosum* var. *matthewsiae* (Springdale phase), at least in part. The yellow flowers of the Shivwits phase seem to have been secondarily derived from *E. corymbosum* var. *aureum* (*E. aureum* Jones, in a strict sense), where occasional specimens have loosely tomentose inflorescences and the involucres are shortly obconic as in var. *glutinosum*. In other specimens of the Shivwits phase the narrowly obconic involucres are essentially like those of var. *albiflorum*. The recognition of any of these phases at taxonomic rank is problematical because of intermediates connecting most if not all of them. A key is provided for the main kinds observed. The use of names applied in other taxa does not indicate nomenclatural combination, and none is intended or implied herewith.

1.	Flowers yellow	2
—	Flowers white	3
2(1).	Plants subscapose, with long petioles and oblong-oval leaf blades; growing east of Kanab and in Washington County	*E. thompsonae* var. *thompsonae*
—	Plants definitely caulescent, with petioles short and leaf blades oval to oblong or lanceolate	"Shivwits phase"
3(1).	Plants subscapose, with long petioles and elliptic to oblong-oval leaf blades; known from eastern Washington County and transitional to the next	*E. thompsonae* var. *albiflorum*
—	Plants caulescent, with long or short petioles and leaf blades oval to oblong or lanceolate	"Springdale phase"

Eriogonum trichopes **Torr.** Slender-stipe Buckwheat. [*E. trichopodum* Torr. in DC.; *E. trichopodum* var. *minus* Benth. in DC.]. Annuals, 8–45 cm tall; leaves all basal; blades mainly 5–30 mm long, 4–25 mm wide, oval to orbicular, hirtellous on one or both sides, obtuse to cordate basally, entire to undulate-crisped; petioles 3–40 mm long or more; peduncles and primary rays of inflorescence inflated or not; inflorescence polychotomous; involucres borne on capillary stipes 3–18 mm long, obconic to campanulate, 0.4–1 mm long, glabrous, 4-lobed; flowers yellowish, 1–2 mm long, strigulose, the segments lance-ovate; achenes 1.5–2 mm long. Warm desert shrub communities at 760 to 980 m in Washington County; Nevada and California to New Mexico, south to Mexico; 10 (i). This species simulates the annual phase of *E. inflatum* in having inflated stems in some

plants. The usually more numerous branches from the lowest node of the inflorescence, and flowers and involucres that average smaller, are diagnostic.

***Eriogonum tumulosum* (Barneby) Reveal** Woodside Buckwheat. [*E. villiflorum* var. *tumulosum* Barneby, type from SW of Woodside]. Pulvinate-caespitose, mound-forming, herbaceous perennials from a pluricipital caudex and woody taproot, the caudex branches clothed with persistent leaves and bases, the roots with shaggy castaneous to blackish bark; leaves 3–7 mm long, 0.7–1.5 mm wide, oblanceolate to elliptic, tomentose to pilose on both surfaces, revolute; petioles very short; scapes to ca 1 cm long or lacking; inflorescences capitate; involucres campanulate, 2–4 mm long, villous, 7- to 10-lobed; flowers white or suffused with pink, 3–4 mm long, pilose, the segments oblong to oblanceolate; achenes ca 2 mm long. Mixed desert shrub and pinyon-juniper communities at 1525 to 2170 m in Duchesne, Emery, and Uintah counties; Colorado; a Colorado Plateau endemic; 16 (ii).

***Eriogonum umbellatum* Torr.** Sulfur Buckwheat. Perennial herbs or subshrubs, mat forming, mainly 1–10 dm across; vegetative stems persistent, the branches woody and usually more or less clothed with persistent ashy, castaneous, or blackish leaves and bases; flowering stems scapose, arising from rosette-like stem apices, mainly 10–60 cm tall; leaf blades 4–30 mm long, 2–20 mm wide, ovate to oval, elliptic, lanceolate, or oblanceolate, tomentose or glabbrous on one or both sides, flat or nearly so; petioles 2–15 mm long; inflorescence umbellate (or compound) or capitate, often immediately subtended by foliose bracts; involucres terminating rays or sessile, obconic to campanulate, the tube 2–6 mm long and 1.5–10 mm wide, the lobes 1–6 mm long; flowers creamy white to yellow and often suffused with red or purple, 2.5–10 mm long (including the stipitate base), the segments spatulate to ovate; achenes 2–5 mm long. This species is a portion of a huge assemblage occupying much of the western U.S. There are four more or less geographically correlated varieties present.

1.	Flowers creamy white	*E. umbellatum* var. *majus*
—	Flowers yellow	2
2(1).	Inflorescences of compound umbels, at least some; plants mainly of middle to lower elevations in the southern two-thirds of Utah	*E. umbellatum* var. *subaridum*
—	Inflorescences merely umbellate or capitate	3
3(2).	Inflorescences capitate or rarely some branched; leaves glabrous on both sides; plants of high elevations	*E. umbellatum* var. *porteri*
—	Inflorescences umbellate; leaves variously pubescent, sometimes as above; plants of moderate to high elevations	*E. umbellatum* var. *umbellatum*

Var. *majus* Hook. Cream Buckwheat. [*E. subalpinum* Greene; *E. umbellatum* var. *subalpinum* (Greene) Jones; *E. umbellatum* ssp. *subalpinum* (Greene) Stokes; *E. heracleoides* var. *subalpinum* (Greene) R. J. Davis; *E. umbellatum* ssp. *majus* (Hook.) Piper; *E. aridum* Greene; *E. umbellatum* ssp. *aridum* (Greene) Stokes; *E. umbellatum* var. *aridum* (Greene) C. L. Hitchc.; *E. umbellatum* var. *dicrocephalum* Gandg.; *E. umbellatum* var. *desereticum* Reveal, type from Mt. Timpanogos]. Sagebrush, mountain brush, pinyon-juniper, Douglas fir-white fir, aspen, lodgepole pine, and spruce-fir communities at 1495 to 3420 m in Beaver, Box Elder, Cache, Carbon, Daggett, Davis, Duchesne, Garfield, Juab, Millard, Rich, Salt Lake, Sanpete, Sevier, Summit, Tooele, Wayne, and Weber counties; Canada, south to California and Nevada; 73 (vi). This plant forms apparent hybrids (Neese 14620 A-E BRY) with *E. heracleoides*. It is also identical, except for flower color, with var. *umbellatum* and has a similar sequence of pubescence forms.

Var. *porteri* (Small) Stokes Porter Buckwheat. [*E. porteri* Small, type from Bear River Canyon, Summit County]. Ponderosa pine, aspen, spruce-fir, lodgepole pine, and alpine meadow and talus communities at 2500 to 3700 m in Beaver, Duchesne, Iron, Sanpete, Sevier, Summit, and Uintah counties; Nevada and Colorado; 41 (xi).

Var. *subaridum* Stokes Arid Buckwheat. [*E. umbellatum* ssp. *subaridum* (Stokes) Munz; *E. biumbellatum* Rydb., type from Fish Lake; *E. ferrissii* A. Nels.; *E. umbellatum* ssp. *ferrissii* (A. Nels.) Stokes]. Sagebrush, mountain brush, pinyon-juniper, and Douglas fir communities at 1370 to 2745 m in Beaver, Emery, Garfield, Iron, Juab, Kane, Millard, San Juan, Sanpete, Sevier, Summit, Tooele, Washington, and Wayne counties; Colorado, Arizona, Nevada, and California; 79 (xvi). Occasional specimens share features, especially simple inflorescences and pubescence phases, with other varieties of the species.

Var. *umbellatum* [*E. luteum* Small ex Rydb.; *E. rydbergii* Greene; *E. cupreum* Gand.; *E. glaberrimum* var. *aureum* Gand.; *E. umbellatum* var. *aureum* (Gand.) Reveal; *E. neglectum* Greene; *E. azaleastrum* Greene; *E. umbelliferum* Small; *E. umbellatum* var. *umbelliferum* (Small) Stokes; *E. marginale* Gand.; *E. umbellatum* var. *intectum* A. Nels; *E. umbellatum* var. *glabratum* Stokes, type from Huntington Canyon]. Sagebrush, mountain brush, pinyon-juniper, ponderosa pine, white fir, aspen, spruce-fir, and alpine meadow communities at 1765 to 3450 m in Beaver, Box Elder, Carbon, Daggett, Duchesne, Emery, Grand, Juab, Millard, Piute, Salt Lake, San Juan, Sanpete, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, and Wayne counties; Washington to Montana, south to California, Nevada, and Colorado; 111 (xv).

Eriogonum villiflorum **Gray** Gray Buckwheat. Pulvinate-caespitose, mound-forming, herbaceous perennials from a pluricipital caudex and woody taproot, the caudex branches clothed with persistent ashy to castaneous or blackish leaf bases and with shaggy blackish bark; leaves 4–15 mm long, 0.7–2 mm wide, oblanceolate to elliptic, villous-pilose on both sides, more or less revolute; petioles very short; scapes mainly 1–5 cm long; inflorescences subcapitate to shortly umbellate; involucres sessile or short-stipitate, campanulate, 3–5 mm long, villous-pilose, with 6–10 lobes; flowers white or suffused with pink, 3–4 mm long, pilose, the segments oblong; achenes 2–3 mm long. Sagebrush, pygmy sagebrush, mixed desert shrub, and pinyon-juniper communities at 1555 to 2350 m in Beaver, Juab, Millard, and Sanpete counties; Nevada; a Great Basin endemic; 17 (iii).

Eriogonum wetherillii **Eastw.** Wetherill Buckwheat. [*E. sessile* Stokes ex Jones; *E. filiforme* L. O. Williams, type from near Hanksville]. Annuals, 5–30 cm high, ultimately forming cushionlike, intricately branched clumps, mainly 8–40 cm wide; leaves all basal; blades 4–40 mm long and about as wide, orbicular to oval, tomentose on one or both sides, obtuse to subcordate basally; petioles 5–50 mm long; inflorescences intricately branched, glabrous, ultimately gray- to red-purple; involucres on filiform stipes, mainly 3–16 mm long or sessile, obconic, glabrous, 0.5–1 mm long, with 4 teeth; involucres yellow, soon suffused with red, 0.6–1.5 mm long, glabrous, the segments elliptic to obovate; achenes 0.6–1 mm long. Blackbrush, shadscale, mixed desert shrub, and pinyon-juniper communities (and often along roadsides) at 1125 to 2135 m in Emery, Garfield, Grand, Kane, San Juan (type from along the San Juan River) , Sevier, and Wayne counties; Colorado, New Mexico, and Arizona; 68 (xii).

Eriogonum wrightii **Torr. in DC.** Wright Buckwheat. Shrubs, mainly 2–5 dm tall; leaves caulescent, mainly 5–25 mm long and 3–10 mm wide, elliptic to oblanceolate, tomentose on both sides, plane or more or less revolute; petioles 1–6 mm long; inflorescence erect-ascending, tomentose, more or less racemose; involucres sessile, obconic, tomentose, 2–4 mm long, with 5 teeth; flowers white or suffused with pink, 3–4 mm long, glabrous, the segments obovate; achenes 2–3 mm long. Pinyon-juniper and mountain brush communities at ca 1190 m in Washington County (upper Beaverdam Wash); California to Texas, south to Mexico; 3 (i).

OXYRIA Hill

Perennial, subrhizomatous herbs, from long taproots; leaves simple, alternate or mostly basal; stipules sheathing; flowers numerous, borne in panicles, not subtended by an involucre; perianth of 4 sepaloid segments, glabrous; stamens 6; pistil 2-carpelled, the ovary 1-loculed, 1-ovuled; styles 2, short, the stigmas fringed; fruit a flattened, wing-margined achene.

Oxyria digyna **(L.) Hill** Mountain sorrel. [*Rumex digynus* L.]. Plants mainly 5–35 cm tall, the herbage often reddish tinged; stems usually simple, the juice acrid; leaves mostly basal; petioles 1–15 cm long; blades 5–50 mm long and as wide or wider, reniform to orbicular, cordate basally; panicles 2–20 cm long; perianth 1–2.5 mm long, the 2 segments at achene edges more slender than those on the flat sides; achenes flattened, 3–6 mm broad, prominently winged. Lodgepole pine, spruce-fir, and alpine meadow communities, often in Talus, at 2560 to 3965 m in Beaver, Box Elder, Cache, Daggett, Duchesne, Piute, Salt Lake, San Juan, Sanpete, Summit, Uintah, Utah, and Weber counties; Alaska and Yukon, east to Labrador, south to California, Arizona, and New Mexico; circumboreal; 38 (ix).

OXYTHECA Nutt.

Annuals; stems dichotomously branched; leaves basal; bracts connate, in 3's, foliaceous; involucres few-flowered, stipitate, more or less campanulate, 4-lobed, the lobes awn tipped; flowers pedicellate; perianth 6-parted; stamens 9; achenes ovoid.

Oxytheca perfoliata **T. & G.** [*Eriogonum perfoliatum* (T. & G.) Stokes]. Plants 6–20 cm tall or more, erect or spreading-ascending; leaves basal and cauline (leafy bracteate), the basal ones 1–4 cm long, spatulate to oblanceolate, sparingly hirsute to glabrous, ciliate; inflorescences short-pedunculate, then dichotomous or trichotomous, with each node bearing a connate-perfoliate, foliaceous, 3-lobed bract ca 1–2 cm wide, the lobes spinose tipped; internodes of inflorescence more or less stipitate-glandular; involucres solitary, obconic, 3–6 mm long, including spines, 4-lobed, each lobe spinose tipped; flowers several; cream to whitish, ca 1.5 mm long, coarsely strigose, the segments lanceolate; achenes ca 2 mm long. Warm desert shrub communities at ca 950 m in Washington County; Arizona, Nevada, and California; 1 (0).

POLYGONUM L.

Plants annual, biennial, or perennial herbs from taproots or rhizomes; leaves alternate, cauline or basal; stipules sheathing; flowers solitary or clustered in leaf axils or in axillary or terminal spikelike racemes or panicles, not subtended by a regular involucre; perianth of 5 petaloid (or sepaloid) segments; stamens 8 (5 and 3) or lacking; pistils usually 3-carpelled, the ovary 1-loculed, 1-ovuled; styles 2 or 3, often very short; achenes lens shaped or 3-angled.

1. Leaves with subcordate, cordate, or hastate bases; flowers in axillary racemes or panicles; plants cultivated ornamentals, escaping and persisting, or weed 2
— Leaves various but not cordate or hastate basally; flowers variously arranged but not as above; plants indigenous or adventive, weedy or not 4

2(1). Stems not twining; leaves broadly obovate, obtuse to subcordate basally; plants clump-forming, cultivated ornamentals, escaping and persisting ..... *P. cuspidatum*
— Stems twining; leaves cordate to hastate; plants sprawling or twining on other plants or structures 3

3(2). Plants perennial; flowers showy, whitish; fruit broadly winged; cultivated ornamentals, escaping and persisting ..... *P. aubertii*
— Plants annual; flowers not showy, greenish; fruit not winged; adventive weedy species ..... *P. convolvulus*

4(1). Stems erect, from an expanded to somewhat bulbous caudex; leaves mostly basal; flowers in terminal spicate racemes; plants mostly of higher elevations 5
— Stems of various habit, but not from a caudex, or, if so, the plants otherwise different from above; flowers axillary or in axillary and terminal spikelike racemes or panicles 6

5(4). Racemes slender, mainly 4–6 mm thick, the lower flowers at least replaced by bulblets ..... *P. viviparum*

— Racemes mainly 10–25 mm thick, the flowers not replaced by bulblets ..... *P. bistortoides*

6(5). Leaves not jointed at the base; flowers in terminal and (or) axillary spikes or racemes 7

— Leaves with a hingelike joint at the point of attachment of leaf base with sheath; flowers in small, axillary clusters or solitary 11

7(6). Inflorescences all terminal, usually solitary; plants perennial, aquatic or semiaquatic to terrestrial; flowers bright pink ..... *P. amphibium*

— Inflorescences not all terminal, at least some axillary; plants mostly annual, seldom aquatic (but sometimes so); flowers pink, green, or white 8

8(7). Stipular sheaths lacking marginal bristles (or merely short-ciliate); veins of the outer pair of perianth segments branched and recurved at the tip .... *P. lapathifolium*

— Stipular sheaths usually with well-developed marginal bristles; veins of the outer pair of perianth segments not branched and recurved at the tip 9

9(8). Plants perennial from rhizomes, growing in or near water; spikes slender, mostly less than 5 mm broad, often paired; not definitely known from Utah, but to be expected ..... *P. hydropiperoides* Michx.

— Plants annual from taproots, growing in moist sites, but not aquatic; spikes slender to thick, not or seldom paired 10

10(9). Mature perianth glandular-punctate, greenish to white (or pinkish); spikes slender, arching, interrupted near the base ..... *P. hydropiper*

— Mature perianth not glandular-punctate, pink to purplish; spikes dense, erect or nearly so, not or rarely interrupted ..... *P. persicaria*

11(6). Flowers in terminal, leafy-bracteate spikes; plants mainly less than 10 cm tall .. .. *P. kelloggii*

-- Flowers in axillary clusters or solitary, or in terminal spikes with bracts much reduced; plant height various 12

12(11). Leaves ovate to broadly elliptic, scarcely reduced upward; plants mainly less than 10 cm tall ..... *P. minimum*

— Leaves linear to narrowly elliptic, lanceolate, or oblanceolate, more or less reduced upward; plant height various 13

13(12). Flowers borne in elongate, spikelike racemes; leaves much reduced and bractlike upward; plants usually erect and with branches erect-ascending .... *P. ramosissimum*

— Flowers borne in axils of foliage leaves, these sometimes reduced but not especially bracteate upward; plants of various habit 14

14(13). Plants mainly prostrate; leaves mostly flat and with prominent lateral veins, often deciduous in fruit ..... *P. aviculare*

— Plants mainly erect or ascending; leaves flat to revolute, the veins inconspicuous, usually persistent ..... *P. douglasii*

Polygonum amphibium **L.** Water Smartweed. [*P. coccineum* Muhl. in Willd.]. Perennial aquatic or terrestrial, rhizomatous or stoloniferous herbs, the herbage coarsely strigose to glabrous or stipitate-glandular; stems prostrate (often floating) or erect; leaf blades mainly 3–18 cm long, 1–6 cm wide, lanceolate to oblong or elliptic, acute to alternate or rounded apically, obtuse to truncate basally; petioles 0.5–7 cm long; stipules cylindric, 0.5–3 cm long, glabrous to coarsely strigose; panicles 1 or 2, spikelike, 1–8 cm long, the peduncles glabrous, glandular, or strigose and also more or less glandular; pedicels 1–2

mm long; flowers bright pink, 4–5 mm long, the segments oblong, subequal; stamens 8, exserted; style 2–4 mm long; achenes lenticular 2–3 mm long, brown, shining or dull. Springs, streams, ponds, lakes, reservoirs, and irrigation canals at 1340 to 2865 m in Cache, Daggett, Duchesne, Garfield, Millard, Piute, Salt Lake, Sevier, Uintah, Utah, and Weber counties; widely distributed in North America; cosmopolitan (except Australia?); 47 (v). Traditional separation of this taxon into two species on the basis of pubescence and panicle differences is not supported by the cline of variation connecting the distinctive extremes.

Polygonum aubertii **L. Henry.** Silver Lace-vine. Perennial, twining herbs; stems mainly 2–7 m long or more; herbage glabrous or scabrous; ocrea soon deciduous, the margin not ciliate; leaf blades 1–8 cm long and 1–6 cm wide, cordate-ovate, cordate basally, attenuate to acuminate apically; petioles 0.5–5 cm long; panicles open, axillary or terminal, 5–15 cm long or more; flowers usually white, 7–10 mm long, including the attenuate winged base, fragrant; fruit lenticular (?), seldom formed. Cultivated ornamental, escaping and persisting in Utah County; introduced from China; 2 (0)

Polygonum aviculare **L.** Knotweed; Chivalry-grass; Dishwater-grass. Annuals, prostrate to ascending or erect, the stems striate, terete or angled, mostly 1–10 dm long; leaves usually not crowded, 5–40 mm long and 2–10 mm wide, oblong to elliptic or oblanceolate, smaller on the branchlets than on the main stem, acute to obtuse or rounded, the blade sessile or short-petiolate above the basal joint; stipules shredded, 3–6 mm long; flowers 1–5 axillary; pedicels included or shortly exserted; perianth 2–3 mm long, united ca one-third the length, 5-lobed, the lobes greenish with white or pink edges, the outer lobes only slightly broader than the inner; styles 3; achenes 3-angled, brown. Weedy species of open sites at 760 to 3085 m in probably all Utah counties; widespread in most continents; 59 (vii). The plants tolerate trampling and similar abuse that forces other plants to yield way to this vigorous species.

Polygonum bistortoides **Pursh** American Bistort. [*P. bistorta* var. *oblongifolium* Meissn. in DC.; *P. bistorta* var. *linearifolium* Wats. Perennials, erect, from thickened bulblike bases and rhizomes, the stems mainly 1–8 dm tall; basal leaves well developed, mainly 5–30 cm long, the blades 2–20 cm long and 0.3–3.5 cm wide, lanceolate to elliptic or linear, attenuate to obtuse or rounded apically, cuneate to obtuse basally; petioles usually well developed, not jointed; stipules mainly 1.5–8 cm long, sometimes flaring apically; cauline leaf blades reduced upward; flowers numerous, borne in terminal spikelike racemes, 1–7 cm long; perianth 4–6 mm long; connate only near the base, white or sometimes pinkish, the segments about equal in size; stamens 8, exserted; styles 3, exserted; achenes brown, shining, ca 4 mm long. Aspen, lodgepole pine, and spruce-fir communities, usually in moist meadows, at 2070 to 3510 m in Beaver, Cache, Daggett, Duchesne, Emery, Garfield, Iron, Juab, Kane, Millard, San Juan, Sanpete, Sevier, Summit, Uintah, Wasatch, Wayne, and Weber counties; British Columbia to Montana, south to California, Arizona, and New Mexico; 68 (x). This species differs in degree only from *P. bistorta* of the Old World and Alaska-Yukon-Mackenzie. The synonyms indicate the views of some previous workers in this genus. Additional work might indicate a more conservative view than that followed here.

Polygonum convolvulus **L.** Black Bindweed. Annuals, erect (when young) or soon prostrate or twining, the stems 1–15 dm long or more; leaves with long petioles not jointed basally, the blades 1–8 cm long (from sinus to apex), 0.7–5 cm wide, sagittate-ovate, acuminate; stipules 2–5 mm long, shredded and soon deciduous; flowers few to many, borne in axillary or terminal racemes; perianth 3–4.5 mm long, greenish, 5-lobed, the outer lobes keeled; styles 3-cleft; achenes 3-angled, black, usually shining. Weedy species of gardens, fields, and other open habitats at 850 to 1680 m in Cache, Salt Lake, Sevier, Utah, and Washington counties; widespread in North America; adventive from Europe; 11 (0).

Polygonum cuspidatum Sieb. & Zucc. Fleece-flower. [*P. zuccarinii* Small]. Perennial, dioecious, erect or ascending herbs, mainly 8–15 dm tall; leaves petiolate, the blades mostly 5–15 cm long and 3–10 (12) cm wide, ovate, cuneate to truncate or sub-

cordate basally, abruptly acuminate apically; stipules 4–8 mm long, soon deciduous; flowers 4–5 mm long or more, including the winged, stipelike base, cream to greenish, functionally imperfect, enlarging in fruit; styles 3; achenes 3-angled, black, smooth, shining, ca 3 mm long. Cultivated ornamentals, escaping and persisting, at 1220 to 1830 m in Duchesne, Salt Lake, and Utah counties; widely grown in the U.S.; introduced from Asia; 5 (0).

***Polygonum douglasii* Greene.** Douglas Knotweed. Annuals, mainly 3–45 cm tall or more, erect or ascending; leaves 6–50 mm long, 1–8 mm wide, linear to oblong, lanceolate or oblanceolate, gradually reduced upward, jointed at the base; stipules lacerate, 3–12 mm long; flowers axillary, usually 1–4 per node, the pedicels erect or reflexed, 14 mm long; perianth 2–4.3 mm long, the segments green with white or pink to reddish margins, or white to pink overall, united only near the base;a chenes 3-angled, black, smooth and shining, 2.5–3.5 mm long. Two rather well-defined but largely sympatric varieties are present in Utah.

1. Flowers deflexed, stipitate above a joint at pedicel apex, the stipe 0.1–0.2 mm long and persistent on the flower base ..... *P. douglasii* var. *douglasii*
— Flowers erect, not stipitate, the base sessile on the joint, dehiscing without a peglike stipe at the base ..... *P. douglasii* var. *johnstonii*

Var. *douglasii* Sagebrush, mountain brush, pinyon-juniper, ponderosa pine, Douglas fir–white fir, aspen, lodgepole pine, and spruce-fir communities at 1705 to 3145 m in Cache, Carbon, Daggett, Duchesne, Garfield, Grand, Juab, Kane, Millard, Salt Lake, Sanpete, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, and Weber counties; widely distributed in North America; 56 (v).

Var. *johnstonii* Munz Sawatch Knotweed. [*P. sawatchense* Small; *P. utahense* Brenkle & Cottam, type from 6 mi N of Escalante]. Pinyon-juniper, mountain brush, sagebrush, and spruce-fir communities at 1675 to 2625 m in Beaver, Carbon, Daggett, Duchesne, Garfield, Grand, Iron, Juab, Kane, Millard, Piute, Rich, San Juan, Sevier, Summit, Tooele, Uintah, Utah, and Washington counties; Washington to North Dakota, south to California, Arizona, and Colorado; 44 (viii). A phase with flowers almost completely white or pink, which tend to open wide (apparently *P. utahense*, sens. str.), occurs in sandy soils in the ponderosa pine and adjacent plant communities in eastern Washington and western Kane and Garfield counties. Possibly these plants are worthy of taxonomic recognition. More work is indicated, but similar plants occur elsewhere within the range of var. *johnstonii*.

***Polygonum hydropiper* L.** Water-pepper. Plants annual (sometimes perennial?), the stems occasionally rooting at the nodes, mainly 3–8 dm tall; leaves with short petioles or else subsessile, not jointed at the base, the blades 3–10 cm long, 0.5–3 cm broad, lanceolate to elliptic, acute to acuminate apically, acute to cuneate basally, sparsely strigose to glabrous, ciliate; stipules 8–15 mm long, not shredded, strigose to glabrous, ciliate with long bristles; flowers several to many, borne in terminal and usually also in lateral, spikelike, interrupted racemes 2–8 cm long; perianth 2.5–4 mm long, glandular-dotted, united ca one-third the length, usually 4-lobed, the lobes greenish with white or pink margins; styles 2 or 3, distinct; achenes lens shaped or 3-angled, brown. Irrigation ditches, roadsides, and bottomlands at ca 1340 to 1375 m in Salt Lake and Utah counties; widespread in North America; adventive from Europe; 3 (0). The herbage has a peppery flavor.

***Polygonum kelloggii* Greene** Kellogg Knotweed. Annuals, erect or ascending, 1–9 cm tall, the stems angled, simple or branched; leaves 3–20 (25) mm long, 0.5–2 mm wide, usually crowded and bracteate upward (surpassing the flowers), and sometimes white margined, sessile or nearly so, jointed at the base; stipules lacerate, 2–7 mm long; pedicels mostly included; perianth 1.5–2.5 mm long, connate in lower one-third, the 5 lobes subequal or the outer ones largest, green with white or pink margins; stamens 8, the 5 outer ones with linear filaments and usually abortive anthers; stigmas 3; achenes 3-angled, 1.5–2 mm long, yellow to brownish,

shining and smooth or brown and dull. Mountain brush, sagebrush, ponderosa pine, meadows, lodgepole pine, aspen, and spruce-fir communities at 1830 to 3235 m in Cache, Daggett, Duchesne, Emery, Garfield, Salt Lake, San Juan, Sevier, Summit, Uintah, and Wasatch counties; British Columbia to Montana, south to California, Arizona, and Colorado; 29 (iii).

Polygonum lapathifolium **L.** Willow-weed. [*P. nodosum* Pers.; *P. scabrum* Moench; *P. pensylvanicum* authors, not L.]. Plants annual, erect or prostrate (rarely rooting at the nodes), 1–9 dm long; leaves petiolate to subsessile, not jointed at the base; blades 2–20 cm long, 0.6–7 cm wide, lanceolate to oblong or elliptic, acuminate to acute (abruptly rounded) apically, acute to cuneate basally, glabrous or pubescent, ciliate or glabrous marginally; stipules 5–20 mm long, not shredded, glabrous to pubescent, sparsely short-ciliate to glabrous apically; flowers several to many, borne in spikelike racemes, often aggregated in panicles, the peduncles often stipitate (or sessile) -glandular; perianth 2–3 mm long, not (or sometimes) glandular-dotted, united only near the base, 4- to 5-lobed, the lobes greenish, white, or pink, finally strongly veined, the veins branched apically and the ends recurved; styles 2 or 3; achenes lens shaped or 3-angled, brown, lustrous. Bogs, marshes, sand bars, stream and river margins at 790 to 2135 m in Cache, Daggett, Garfield, Grand, Millard, Piute, Rich, Salt Lake, San Juan, Uintah, Utah, Washington, Wayne, and Weber counties; widely scattered in North America; adventive (or indigenous in part?) from Eurasia; 43 (vi).

Polygonum minimum **Wats.** Broadleaf Knotweed. Annuals, ascending to erect, the stems not conspicuously striate, terete or triangular, 5–10 (25) cm long; leaves crowded only near the stem tips, 5–15 mm long, 2–8 mm wide, elliptic, ovate, or obovate, somewhat smaller above, acute to mucronate apically, acute basally, the blades sessile at the basal joint; stipules shredded, 2–4 mm long; flowers 1–4 axillary; pedicels included; perianth 1.5–2 mm long, united ca one-third the length, 5-lobed, the lobes greenish with white or pink edges, subequal; stigmas 3; achenes 3-angled, black, lustrous. Spruce-fir and alpine communities, often in rockstripes or talus, at ca 2745 to 3390 m in Cache, Salt Lake, and Summit counties; Alaska south to California, Nevada, and Colorado; 3 (0).

Polygonum persicaria **L.** Ladysthumb. Annuals, erect to ascending, mainly 1.5–10 dm tall; leaves petiolate to subsessile, not jointed at the base; blades 1.5–15 cm long, 0.4–4 cm wide, lanceolate to elliptic or oblong, acuminate to attenuate apically, acute to cuneate basally, with a purplish spot near the center, usually glabrous, ciliate; stipules 5–15 mm long, not shredded, usually pubescent, long-ciliate apically; flowers several to numerous, borne in terminal and usually axillary racemes; perianth 1.5–3 mm long, not glandular-dotted, united only near the base, 5-lobed, the lobes pinkish or whitish, not strongly veined and with vein ends not recurved; styles 2 or 3; achenes lens shaped or 3-angled, black, lustrous. Fence lines, canal banks, marshes, pond margins, fields, gardens, and pastures at 915 to 2135 m in Cache, Duchesne, Garfield, Salt Lake, Uintah, Utah, Wasatch, Washington, and Weber counties; widespread in North America; Eurasia; 24 (0).

Polygonum ramosissimum **Michx.** Bushy Knotweed. Annuals, ascending or erect, the stems striate and somewhat angled, 1–10 dm tall; leaves not crowded, 10–50 mm long, 2–6 mm wide, linear-oblong to lance-elliptic, usually acute, gradually reduced upward, short-petiolate above the joint; stipules shredded, 5–10 mm long; pedicels exserted; perianth 2.4–4.4 mm long, united ca one-third the length, 5-lobed, green or with pink, white, or yellow margins, the outer ones broader than the inner; stigmas 3; achenes 3-angled, brown to black, lustrous. Open sites and (mainly) in saline meadows at 1340 to 1770 m in Cache, Duchesne, Juab, Millard, Salt Lake, Uintah, and Utah counties; widespread in North America; Europe; 23 (0). The closely allied, but hardly differentiated and possibly identical *P. argyrocoleon* Steud. has been identified from Utah. The material grades continously with *P. ramosissimum*, and the older name is applied. That taxon might be valid beyond Utah.

Polygonum viviparum **L.** Alpine Bistort. Perennials, erect from short, expanded bases;

stems 7–40 (55) cm tall; basal leaves well developed, 3–25 cm long, the blades 1.5–13 cm long, 3–25 mm wide, oblong to elliptic, lanceolate, or oval, attenuate to acute apically, cuneate to subcordate basally; petioles well developed, not jointed; cauline leaves reduced upward; stipules 1–6 cm long, not shredded, often flaring and brownish apically, the upper ones seldom bladeless; flowers several to numerous, borne in terminal, spikelike racemes 2–12 cm long, at least the lower (sometimes all) replaced by bulblets; perianth 2–3.5 mm long, the lobes connate only near the base, 5-lobed, greenish with with white (cream) to pink margins, subequal; stamens often vestigial; styles 3, exserted; achenes 3-angled, brownish, lustrous, seldom developing. Sedge-grass meadows and alder-birch-willow streamside habitats, mainly in lodgepole pine and spruce-fir communities, at 2470 to 3570 m in Daggett, Duchesne, Emery, Garfield, San Juan, Sevier, Summit, and Uintah counties; Alaska east to Newfoundland, south to Oregon, Nevada, New Mexico, Minnesota, and Maine; 21 (vi).

RUMEX L.

Annual, biennial, or perennial herbs from stout taproots or rhizomes; leaves alternate, basal or mostly cauline, gradually reduced upward; stipules sheathing; flowers borne in panicles, not subtended by a regular involucre; perianth of 6 (rarely 4), petaloid or sepaloid segments, the inner 3 segments enlarging in fruit and forming the "wings" or "valves" enclosing the fruit, the midveins of the valves sometimes thickened and forming grainlike tuberosities on the segments; stamens usually 6; pistil 3-carpelled, the ovary 1-loculed, 1-ovuled; styles 3; fruit a 3-angled achene.

RECHINGER, K. H. JR. 1937. The North American species of *Rumex*. Field Museum Publ. Bot. 17:1m151.

1. Flowers mostly or entirely imperfect; plants usually dioecious; leaves hastate or elliptic to oblanceolate 2
— Flowers all or mostly perfect; leaves various 3

2(1). Leaves all or some of them hastate; plants rhizomatous, sod forming, weedy ..... *R. acetosella*
— Leaves elliptic, tapering at both ends; plants from thick taproots, not sod forming, not weedy ..... *R. paucifolius*

3(1). Plants rhizomatous, the rhizomes black, spreading; valves of fruit mainly 10–20 mm wide ..... *R. venosus*
— Plants from taproots (sometimes tuberous); valves of fruit less than 10 mm wide, or, if wider (as in *R. hymenosepalus*), from deeply set tuberous roots 4

4(3). Plants from deeply set tuberous roots; valves of fruit usually 10–20 mm wide when mature; habitats in sand dunes and other sandy sites ..... *R. hymenosepalus*
— Plants from a superficial taproot; valves of fruit less than 10 mm wide at maturity; habitats various, but seldom if ever as above 5

5(4). Valves toothed along the margins, the teeth at least 1 mm long at maturity 6
— Valves entire or toothed, but, if toothed, the teeth less than 1 mm long 9

6(5). Tuberosities lacking or forming on only 1 or 2 of the valves; basal leaves mainly 5–10 cm wide or more ..... *R. obtusifolius*
— Tuberosities usually forming on all valves; leaves mostly less than 4 cm wide (wider in *R. occidentalis*) 7

7(6). Plants perennial; inflorescences paniculate, not especially verticillate in lower nodes ..... *R. stenophyllus*
— Plants annual; inflorescences of verticillate panicles, the verticels apparent in lower nodes and sometimes throughout 8

8(7). Valves 4–6 mm long at maturity; teeth subulate; tuberosities more than 0.5 mm wide; leaves not papillose ..... *R. dentatus*

— Valves 2–3 mm long; teeth bristlelike; tuberosities less than 0.5 mm wide; leaves papillose, at least some ..... *R. maritimus*

9(5). Stems with axillary branches at some or all nodes below the inflorescence, usually decumbent-ascending ..... *R. salicifolius*

— Stems seldom with axillary branches below the inflorescence (except in some *R. occidentalis*), erect or essentially so 10

10(9). Valves without tuberosities, even in fruit ..... *R. occidentalis*

— Valves with tuberosities on 1 or more of them 11

11(10). Valves cordate, 5–9 mm long; basal and lower leaves typically rounded to truncate or cordate, the margins not especially crisped ..... *R. patentia*

— Valves triangular-ovate, mostly 3–5 mm long; basal and lower leaves rounded to acute basally, the margins strongly crisped ..... *R. crispus*

***Rumex acetosella* L.** Sheep Sorrel. Perennial, dioecious, erect herbs from slender rhizomes; stems 1–6 dm tall, usually unbranched below the inflorescence; basal leaves long-petiolate; cauline leaves becoming short-petiolate to subsessile; blades 1–8 cm long, 2–25 mm wide, oblong to ovate, linear, lanceolate, or elliptic, hastately lobed basally, attenuate, acute or obtuse apically; flowers numerous, imperfect, borne in leafless panicles, often purplish tinged; fruiting pedicels jointed at flower base; perianth segments 0.5–1.8 mm long in flower, the outer ones not reflexed, the inner ones enlarging and investing the achene, 1–2 mm long, ovate, entire, lacking tuberosities; achenes 1–2 mm long, yellowish brown, lustrous, sometimes adherent to the valves. Roadsides, meadows, and other open sites at 1370 to 2745 m in Beaver, Cache, Carbon, Davis, Duchesne, Emery, Grand, Piute, Salt Lake, Sanpete, Summit, Uintah, and Weber counties; widespread in North America; adventive from Eurasia; 25 (vi).

***Rumex crispus* L.** Curled Dock. Perennial erect herbs from taproots; stems 3–10 dm tall or more; basal leaves long-petiolate; blades 8–40 cm long, 1.2–6 cm wide, oblong-lanceolate to elliptic, acute to rounded basally, acuminate to acute apically, undulate-crisped (the margin appearing irregularly lobed due to numerous overlapping folds in pressed specimens; cauline leaves somewhat smaller upward, short-petiolate; flowers numerous, perfect, borne in panicles with large leafy bracts to midlength or above, usually greenish; fruiting pedicels jointed above the base; perianth 1.5–2 mm long, the outer segments not reflexed; inner segments much enlarged in fruit, 3–5 mm long, cordate to deltoid or ovate, denticulate to entire, usually each (sometimes only 1 or 2) bearing a reticulately patterned tuberosity almost half as long as the segment; achenes 2–3 mm long, brown, lustrous. Weedy plants of open sites at 760 to 2440 m in probably all Utah counties; widespread in North America; adventive from Eurasia; 72 (v).

Rumex dentatus L. Annual or biennial herbs, erect, from tap or fibrous roots; stems mainly 2–7 dm tall; leaves cauline or essentially so, the lower ones long-petiolate; blades 1–6 cm long, oblong, rounded to subcordate basally, rounded to acute apically; flowers mainly perfect, borne in verticillate panicles; pedicels thickened apically, jointed below midlength; valves in fruit triangular, 4–6 mm long, toothed marginally, the teeth 1.5–2 mm long, usually all with a pronounced tuberosity. Moist, open sites at ca 1340 m in Salt Lake County (Arnow 5263 UT); adventive from Asia; 1 (0).

***Rumex hymenosepalus* Torr.** Canaigre. Perennial herbs, from deeply seated, tuberous roots; stems mainly 2–10 dm tall; lower leaves long-petiolate; blades mainly 8–25 cm long, 2–12 cm wide, elliptic to lanceolate or oblanceolate, cuneate basally, acute to acuminate apically, more or less fleshy; cauline leaves reduced and short-petiolate upward; stipular sheathes 1–4 cm long; panicles compact, 10–35 (40) cm long, usually pinkish; pedicels 4–12 mm long, jointed near the middle; perianth 2–4 mm long at anthesis,

the valves 8–18 mm long in fruit, cordate-ovate to suborbicular, reticulate, rounded apically. Blackbrush, Vanclevea, ephedra, and other sandy desert shrub communities at 760 to 1680 m in Daggett, Garfield, Grand, Kane, San Juan, Uintah, and Washington counties; California, Nevada, Arizona, New Mexico, Texas, Colorado, and Wyoming; Mexico; 49 (vi).

Rumex maritimus **L.** Golden Dock. [*R. maritimus* var. *athrix* St. John, type from Vermillion]. Annual (or biennial?) herbs, erect from taproots; stems 0.5–8 dm tall; basal leaves usually reduced; cauline leaves well developed, but reduced in size upward, short-petiolate; blades 2–15 cm long, 1–4 cm wide, oblong to lanceolate, rounded to subcordate or acute basally, acute to acuminate or obtuse apically, undulate to plane; flowers numerous, borne in compact axillary clusters, the inflorescence leafy throughout or nearly so, often half the total plant height, greenish; pedicels jointed near or at the base; perianth 1–2 mm long in flower, the outer ones not reflexed; inner segments 3–7 mm long (including the acuminate apex) in fruit, ovate, with 2–4 slender teeth per segment, each tooth 1.5–5 mm long, the valves each usually with a well-developed tuberosity ca half as long as the segment; achenes 1.5–2 mm long, brown, lustrous. Lake shores, stream margins, pond and seep margins, and other moist sites at 1220 to 2565 m in Cache, Carbon, Daggett, Duchesne, Emery, Garfield, Juab, Kane, Piute, Rich, Salt Lake, Sanpete, Uintah, and Wayne counties; widespread in North and South America; Europe; 40 (ii). Our specimens belong to var. fuegineus (Phil.) Dusen [*R. fuegineus* Phil.; *P. maritimus* ssp.*fuegineus* (Phil.) Hulten].

Rumex obtusifolius **L.** Bitter Dock. Perennial, erect herbs from taproots; stems 4–12 dm tall (or more), usually unbranched below the inflorescence; basal leaves long-petioled; blades 10–40 cm long, 4–15 cm wide, ovate to oblong or lanceolate, cordate to truncate basally, obtuse to acute or acuminate apically, undulate; cauline leaves like the basal ones, somewhat smaller and with shorter petioles upward; flowers numerous, perfect, borne in panicles with leafy bracts to the middle or above, usually greenish; perianth segments 2–3 mm long, the outer ones not reflexed; inner segments 3.5–5 mm long in fruit, ovate, with 4–6 teeth per segment, each tooth 0.5–2 mm long, at least some valves with a prominent tuberosity; achenes 1.5–2 mm long, brown, lustrous. Rural weeds, mainly on canal and stream banks, at 1370 to 2290 m Cache, Davis, Salt Lake, Tooele, and Utah counties; widespread in North America; adventive from Eurasia; 13 (i).

Rumex occidentalis **Wats.** Western Dock. [*R. subalpina* Jones, type from near Marysvale]. Perennial, erect herbs from taproots; stems 5–20 dm tall, usually unbranched below the inflorescence, often reddish tinged; basal leaves long-petioled; blades 0.6–4 dm long, 3–15 cm wide, oblong to ovate or oblong-lanceolate, cordate to truncate or obtuse basally, rounded to obtuse or acute apically, usually more or less undulate-crisped; cauline leaves reduced upward; flowers numerous, perfect, borne in panicles with leafy bracts only near the base, greenish; fruiting pedicels obscurely jointed near or below the middle; perianth segments 2–4 mm long, the outer ones not reflexed, the inner ones 4–10 mm long in fruit, ovate to oval (mostly longer than broad), denticulate to entire, lacking tuberosities; achenes 3–4 mm long, brown, lustrous. Meadows, aspen, and spruce-fir communities at 1830 to 3175 m in Duchesne, Garfield, Sanpete, and Wasatch counties; Alaska to Quebec, south to California, evada, New Mexico, and South Dakota; 5 (0).

Rumex patentia **L.** Perennial, erect herbs from a taproot; stems mainly 6–15 dm tall, unbranched below inflorescence; basal leaves long-petiolate; blades mainly 10–30 cm long and 6–15 cm wide, ovate-oblong to lanceolate or oblong, subcordate to truncate or acute basally, acute to acuminate apically; panicles dense, 2–5 dm long, leafy bracteate to the middle; pedicels jointed at or below the middle; flowers perfect, outer segments 1.5–2 mm long, finally reflexed, inner ones 5–9 mm long in fruit, ovate to suborbicular and cordate basally, entire to denticulate, one valve (only) with a tuberosity; achenes 3–3.5 mm long. Weedy species of open sites at 1340 to 2440 m in Cache, Salt Lake, and Utah counties; widely distributed in North America; introduced from Eurasia; 6 (i). This species is not clearly differentiated from

R. occidentalis q.v., and evidently forms intermediates with both *R. crispus* and *R. obtusifolius*.

Rumex paucifolius **Nutt.** Alpine Sorrel. Perennial, dioecious herbs from a taproot and thick root-crown; stems mainly 1–7 dm tall, unbranched below the inflorescence; basal leaves well developed, petiolate; blades 2–13 cm long, elliptic, acute to attenuate at both ends, much reduced upward; inflorescence essentially ebracteate, often as much as half the plant height; flowers imperfect, commonly red; pedicels jointed near the middle; outer perianth segments not reflexed; valves 3–4 mm long, cordate to suborbicular, lacking tuberosities; achenes smooth, ca 1.5 mm long. Meadows in aspen and spruce-fir communities at 2095 to 3050 m in Cache, Rich, Salt Lake, Summit, and Wasatch counties; British Columbia and Alberta, south to California and Colorado; 23 (i).

Rumex salicifolius **Weinm.** Beach Dock. Perennial, decumbent to ascending (or erect) herbs from taproots, mainly 2–6 dm tall, branching from the lower nodes; leaves mostly cauline, short-petiolate, not much reduced upward; blades 3–20 cm long, 3–30 mm wide, narrowly lanceolate to oblong or linear, acute to rounded basally, acute apically, plane to undulate, not crisped; flowers numerous, perfect, borne in panicles, these more or less leafy-bracteate, usually greenish; fruiting pedicels jointed near the base; perianth segments 1–2 mm long, outer ones not reflexed, inner 2–4 mm long in fruit, ovate to deltoid, entire to denticulate, with tuberosities on all valves or lacking on all valves; achenes 1.5–2.5 mm long, brown, lustrous. Salt grass, salt desert shrub, sagebrush, pinyon-juniper, mountain brush, aspen-tall forb, Douglas fir, and spruce-fir communities at 1340 to 3205 m in Beaver, Cache, Carbon, Davis, Duchesne, Emery, Garfield, Iron, Juab, Kane, Piute, Rich, Salt Lake, Sanpete, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, and Weber counties; Alaska to Quebec, south to California, Texas, and New York; 79 (viii). Our material has been treated within two varities; var. ***montigenitus*** **Jepson,** with tuberosities lacking on the valves, and var. ***mexicanus*** **(Meisn.) C. L. Hitchc.** [*R. mexicanus* Meisn.; *R. utahensis* Rech. f.], with tuberosities on the valves. Transitional specimens connect the varieties, which are not geographically correlated. Both of the varieties are regarded as phases within ssp. *triangulivalvis* Danser.

Rumex stenophyllus **Ledeb.** Perennial, erect herbs from taproots, mainly 3–9 dm tall; leaves basal and cauline, petiolate; blades 4–20 cm long, 1–5 cm wide, lanceolate to lance-oblong or elliptic, obtuse to acute basally, acute to attenuate apically; panicles loose to dense, mainly 2–4 dm long; pedicels jointed below the middle; outer perianth segments 1–2 mm long, the valves with tuberosities; achenes 2–2.5 mm long, lustrous. Palustrine, riparian, and lacustrine habitats at ca 1400 to 1590 m in Uintah (near Ouray) County; Wyoming; adventive from Eurasia (?); 5 (0). These plants are more or less intermediate between *R. obtusifolius* and *R. crispus*, neither of which is known from the locality where this species occurs.

Rumex venosus **Pursh** Perennial herbs from creeping rhizomes; stems erect, 1–5 dm tall, usually branched; stipules conspicuous, 1–5 cm long; leaves cauline, the lowermost lacking blades; blades mostly 2–14 cm long, 1–6 cm wide, ovate to elliptic or oblong, leathery, obtuse to acute basally; flowers numerous, in more or less leafy bractrate panicles; pedicels jointed near the middle; perianth segments 4–5 mm long, the valves 15–35 mm long, usually suffused with red, orbicular to subreniform, cordate basally, rounded apically, reticulate, lacking tuberosities; achenes 5–6 mm long, smooth. Sand dunes and other sandy habitats at 1370 to 2230 m in Cache, Davis, Grand, Juab, Kane, Millard, Salt Lake, Tooele, Uintah, and Utah counties; British Columbia to Saskatchewan, south to California, New Mexico, and Nebraska; 15 (iii).